OMRON

Machine Automation Controller

CJ-series

ID Sensor Units

Operation Manual for NJ-series CPU Unit

CJ1W-V680C11
CJ1W-V680C12

ID Sensor Units

Z317-E1-03

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Introduction

Thank you for purchasing CJ-series CJ1W-V680C11/V680C12 ID Sensor Unit.
This manual contains information that is necessary to use the CJ-series CJ1W-V680C11/V680C12 ID Sensor Unit for an NJ-series CPU Unit. Please read this manual and make sure you understand the functionality and performance of the NJ-series CPU Unit before you attempt to use it in a control system.
Keep this manual in a safe place where it will be available for reference during operation.

Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of introducing FA systems.
- Personnel in charge of designing FA systems.
- Personnel in charge of installing and maintaining FA systems.
- Personnel in charge of managing FA systems and facilities.

For programming, this manual is intended for personnel who understand the programming language specifications in international standard IEC 61131-3 or Japanese standard JIS B3503.

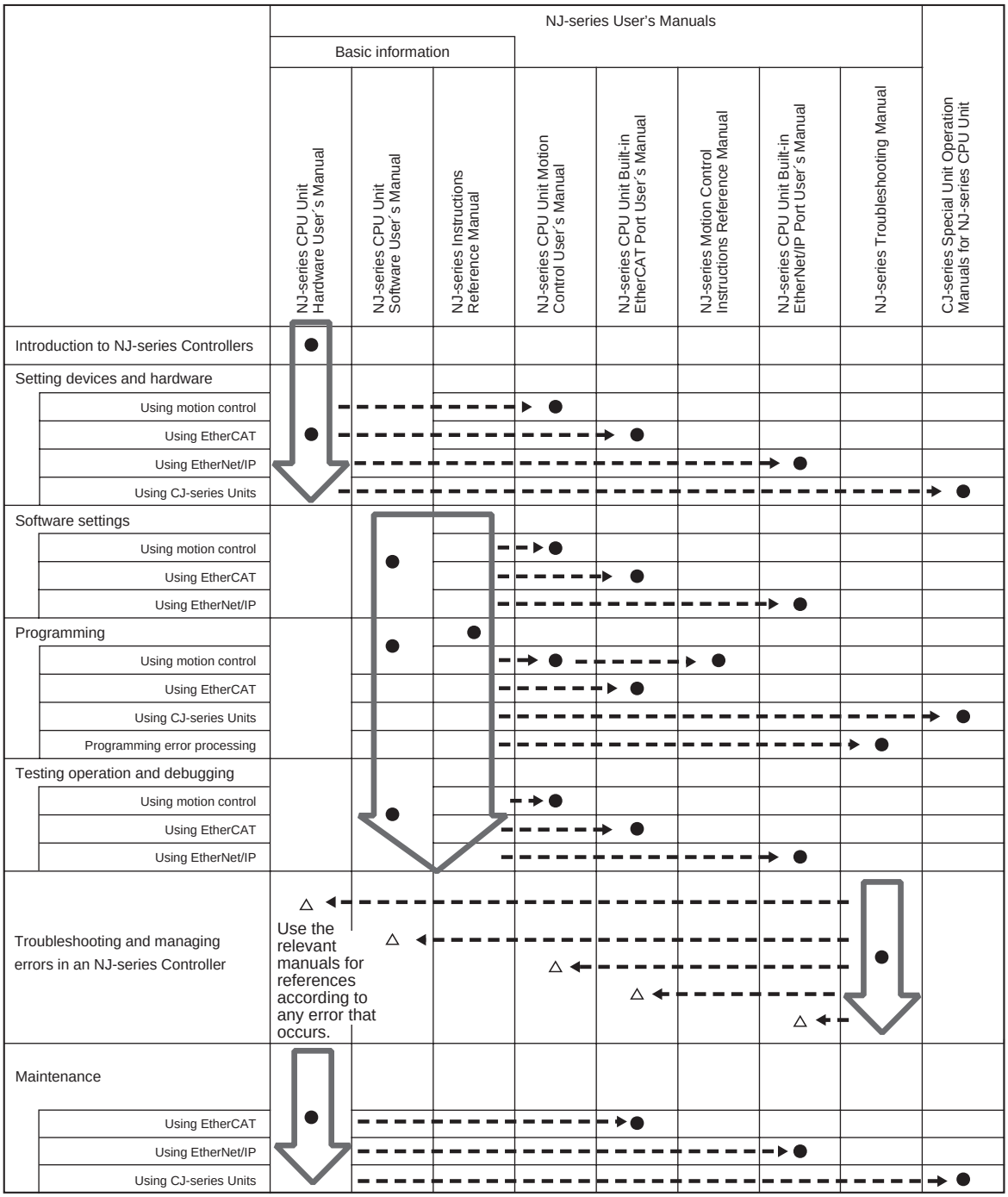
Applicable Products

This manual covers the following products.

CJ-series CJ1W-V680C11/V680C12 ID Sensor Unit

Relevant Manuals

There are three manuals that provide basic information on the NJ-series CPU Units: the *NJ-series CPU Unit Hardware User's Manual*, the *NJ-series CPU Unit Software User's Manual*, and the *NJ-series Instructions Reference Manual*.
Most operations are performed from the Sysmac Studio Automation Software. Refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504) for information on the Sysmac Studio.
Other manuals are necessary for specific system configurations and applications.
Read all of the manuals that are relevant to your system configuration and application to make the most of the NJ-series CPU Unit.



Manual Configuration

NJ-series CPU Unit Hardware User's Manual (Cat. No. W500)

Section	Description
Section 1 Introduction	This section provides an introduction to the NJ-series Controllers and their features, and gives the NJ-series Controller specifications.
Section 2 System Configuration	This section describes the system configuration used for NJ-series Controllers.
Section 3 Configuration Units	This section describes the parts and functions of the configuration devices in the NJ-series Controller configuration, including the CPU Unit and Configuration Units.
Section 4 Installation and Wiring	This section describes where and how to install the CPU Unit and Configuration Units and how to wire them.
Section 5 Troubleshooting	This section describes the event codes, error confirmation methods, and corrections for errors that can occur.
Section 6 Inspection and Maintenance	This section describes the contents of periodic inspections, the service life of the Battery and Power Supply Units, and replacement methods for the Battery and Power Supply Units.
Appendices	The appendices provide the specifications of the Basic I/O Units, Unit dimensions, load short-circuit protection detection, line disconnection detection, and measures for EMC Directives.

NJ-series CPU Unit Software User's Manual (Cat. No. W501)

Section	Description
Section 1 Introduction	This section provides an introduction to the NJ-series Controllers and their features, and gives the NJ-series Controller specifications.
Section 2 CPU Unit Operation	This section provides information that is necessary to use the CPU Unit, including how the CPU Unit works and the operations that it performs depending on the status of the CPU Unit.
Section 3 I/O Ports, Slave Configuration, and Unit Configuration	This section describes how to use I/O ports, how to create the slave configuration and unit configuration and how to assign functions.
Section 4 Controller Setup	This section describes the initial settings of the function modules.
Section 5 Designing Tasks	This section describes the task system and types of tasks.
Section 6 Programming	This section describes programming, including the programming languages and the variables and instructions that are used in programming.
Section 7 Checking Operation and Actual Operation	This section describes the items and procedures for checking the operation of an NJ-series Controller, including offline debugging procedures.
Section 8 CPU Unit Functions	This section describes the functionality provided by the CPU Unit.
Section 9 Communications Setup	This section describes how to go online with the CPU Unit and how to connect to other devices.
Section 10 Example of Actual Application Procedures	This section describes the procedures that are used to actually operate an NJ-series Controller.
Section 11 Troubleshooting	This section describes the event codes, error confirmation methods, and corrections for errors that can occur.
Appendices	The appendices provide the CPU Unit specifications, task execution times, specifications of individual system-defined variables, data attribute lists, CJ-series Unit memory information, CJ-series Unit memory allocation methods, and version information.

Sysmac Studio Version 1 Operation Manual (Cat. No. W504)

Section	Description
Section 1 Introduction	This section provides an overview and lists the specifications of the Sysmac Studio and describes its features and components.
Section 2 Installation and Uninstallation	This section describes how to install and uninstall the Sysmac Studio.
Section 3 System Design	This section describes the basic concepts for designing an NJ-series System with the Sysmac Studio and the basic operating procedures.
Section 4 Programming	This section describes how to create programs with the Sysmac Studio.
Section 5 Online Connections to a Controller	This section describes how to go online with a Controller.
Section 6 Debugging	This section describes how to debug the programs online on the Controller or debug it offline with the Simulator.
Section 7 Other Functions	This section describes other functions that are supported by the Sysmac Studio, including security functions and troubleshooting functions.
Section 8 Reusing Programming	This section describes how to reuse the programs that you create with the Sysmac Studio.
Section 9 Support Software Provided with the Sysmac Studio	This section describes the Support Software that is provided with the Sysmac Studio.
Section 10 Troubleshooting	This section describes the error messages that are displayed when you check a program on the Sysmac Studio and how to correct those errors.
Appendices	The appendices describe the following: Driver Installation for Direct USB Cable Connection Specifying One of Multiple Ethernet Interface Cards Online Help Simulation Instructions

CJ-series ID Sensor Units Operation Manual for NJ-series CPU Unit (Cat. No. Z317) (This Manual)

Section	Description
Section 1 Features and System Configuration	This section describes the features and the system configuration of the ID Sensor Units.
Section 2 Specifications of ID Sensor Units	This section describes where and how to install the ID Sensor Unit, and how to connect and wire the Units.
Section 3 Data Exchange with the CPU Unit	This section describes the data exchange between the CPU Unit and ID Sensor Unit and the definitions of the device variables for CJ-series Unit.
Section 4 ID Sensor Unit Functions	This section describes the functionality provided by the ID Sensor Unit and the initial settings.
Section 5 Controlling the ID Sensor Unit	This section describes the operations of the ID Sensor Unit and the communications commands.
Section 6 Troubleshooting Alarms and Errors	This section describes the troubleshooting procedure, event logs and maintenance procedure for the ID Sensor Unit.
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RFID System V680 Series User's Manual for Amplifiers, Antennas, and ID Tags (FRAM) (Cat. No. Z248)

Section	Description
Section 1 Product Overview	This section describes the features and product configurations of V680 Series Amplifiers, Antennas, and ID Tags.
Section 2 Specifications and Performance	This section describes the specifications and performance of V680 Series Amplifiers, Antennas, and ID Tags.
Section 3 Communications Specifications	This section describes the communications distances and communication time of V680 Series Amplifiers, Antennas, and ID Tags.
Section 4 Installation	This section describes the installation medhod, dimensions, and precautions of V680 Series Amplifiers, Antennas, and ID Tags.
Section 5 Chemical Resistance	This section describes the chemical resistnace and degree of protection of V680 Series Amplifiers, Antennas, and ID Tags.

RFID System V680 Series User's Manual for Amplifiers, Antennas, and ID Tags (EEPROM) (Cat. No.Z262)

Section	Description
Section 1 Product Overview	This section describes the features and product configurations of V680 Series Amplifiers, Antennas, and ID Tags.
Section 2 Specifications and Performance	This section describes the specifications and performance of V680 Series Amplifiers, Antennas, and ID Tags.
Section 3 Communications Specifications	This section describes the communications distances and communication time of V680 Series Amplifiers, Antennas, and ID Tags.
Section 4 Installation	This section describes the installation medhod, dimensions, and precautions of V680 Series Amplifiers, Antennas, and ID Tags.
Section 5 Chemical Resistance	This section describes the chemical resistnace and degree of protection of V680 Series Amplifiers, Antennas, and ID Tags.

Heat-resistive RFID System V680 Series User's Manual (Cat. No. Z221)

Section	Description
Section 1 Product Overview	This section describes the system configuration and operation overview of Heat-resistive RFID System V680 Series
Section 2 Installation, Connections, and Wiring	This section describes the installation, connections and wiring of Heat-resistive RFID System V680 Series.
Section 3 Before Communications	This section describes the settings and communications test of Heat-resistive RFID System V680 Series.
Section 4 Reading from/Writing to Tags	This section describes the Tag operation and commands of Heat-resistive RFID System V680 Series.
Section 5 Troubleshooting	This section describes the self-diagnostic function and errors and countermeasures of Heat-resistive RFID System V680 Series.
Section 6 Appendices	---

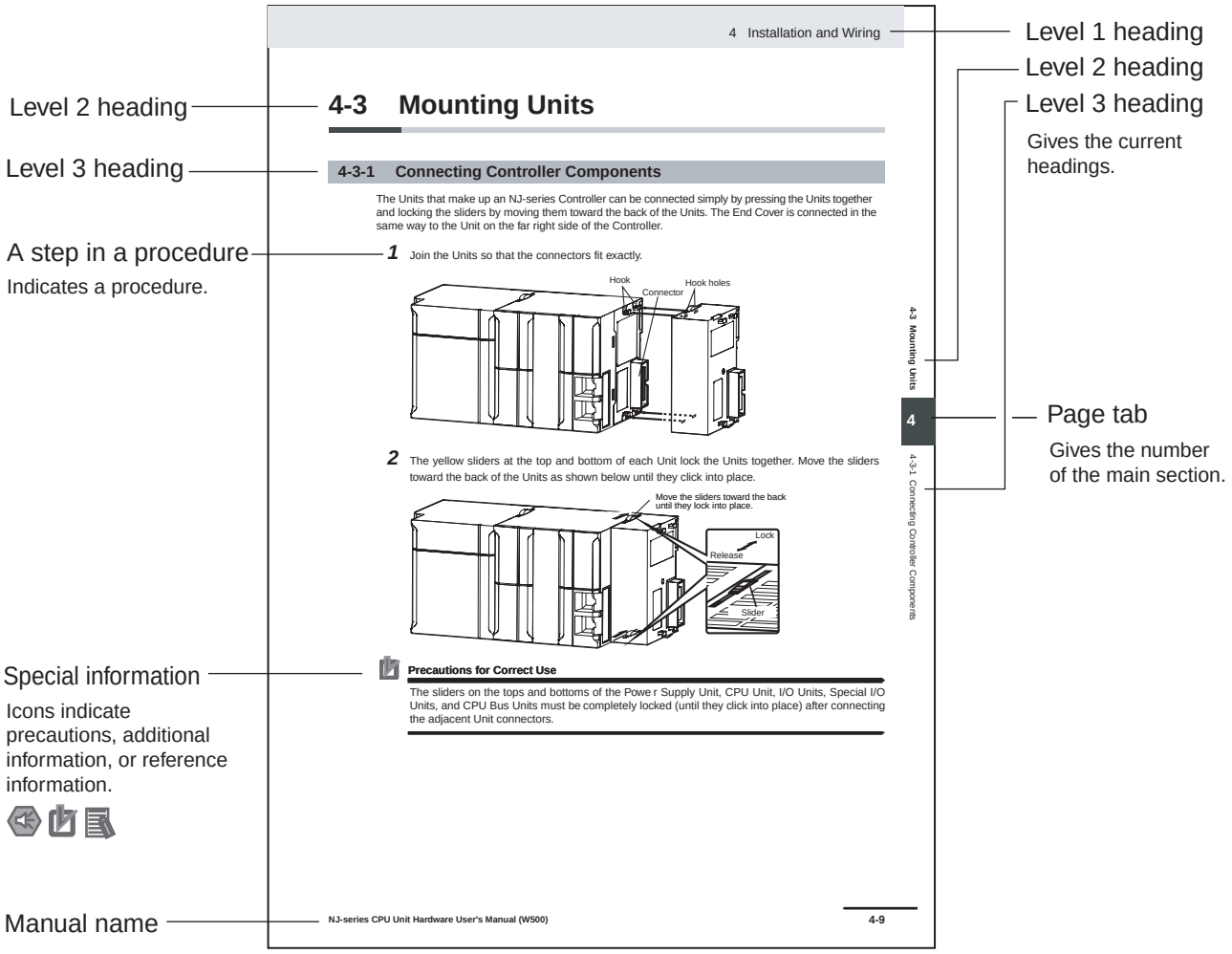
RFID System V680 Series User's Manual ID Sensor Units (Cat. No. Z271)

Section	Description
SECTION 1 Features and System Configuration	This section describes the features and system configuration of ID Sensor Unit.
SECTION 2 CS-series ID Sensor Units	This section describes the specifications, operating procedure and connections and wiring of CS-series ID Sensor Unit.
SECTION 3 CJ-series ID Sensor Units	This section describes the specifications, operating procedure and connections and wiring of CJ-series ID Sensor Unit.
SECTION 4 Data Exchange with the CPU Unit	This section describes the outline of data exchange and I/O data allocations of ID Sensor Unit.
SECTION 5 ID Sensor Unit Functions	This section describes the functions and parameter settings of ID Sensor Unit.
SECTION 6 Controlling the ID Sensor Unit	This section describes the operation and communications commands of ID Sensor Unit.
SECTION 7 Troubleshooting Alarms and Errors	This section describes the error check flow and troubleshooting of ID Sensor Unit.
SECTION 8 Appendices	---

Manual Structure

Page Structure

The following page structure is used in this manual.



This illustration is provided only as a sample. It may not literally appear in this manual.

Special Information

Special information in this manual is classified as follows:

Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.

Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.

Additional Information

Additional information to read as required.
This information is provided to increase understanding or make operation easier.

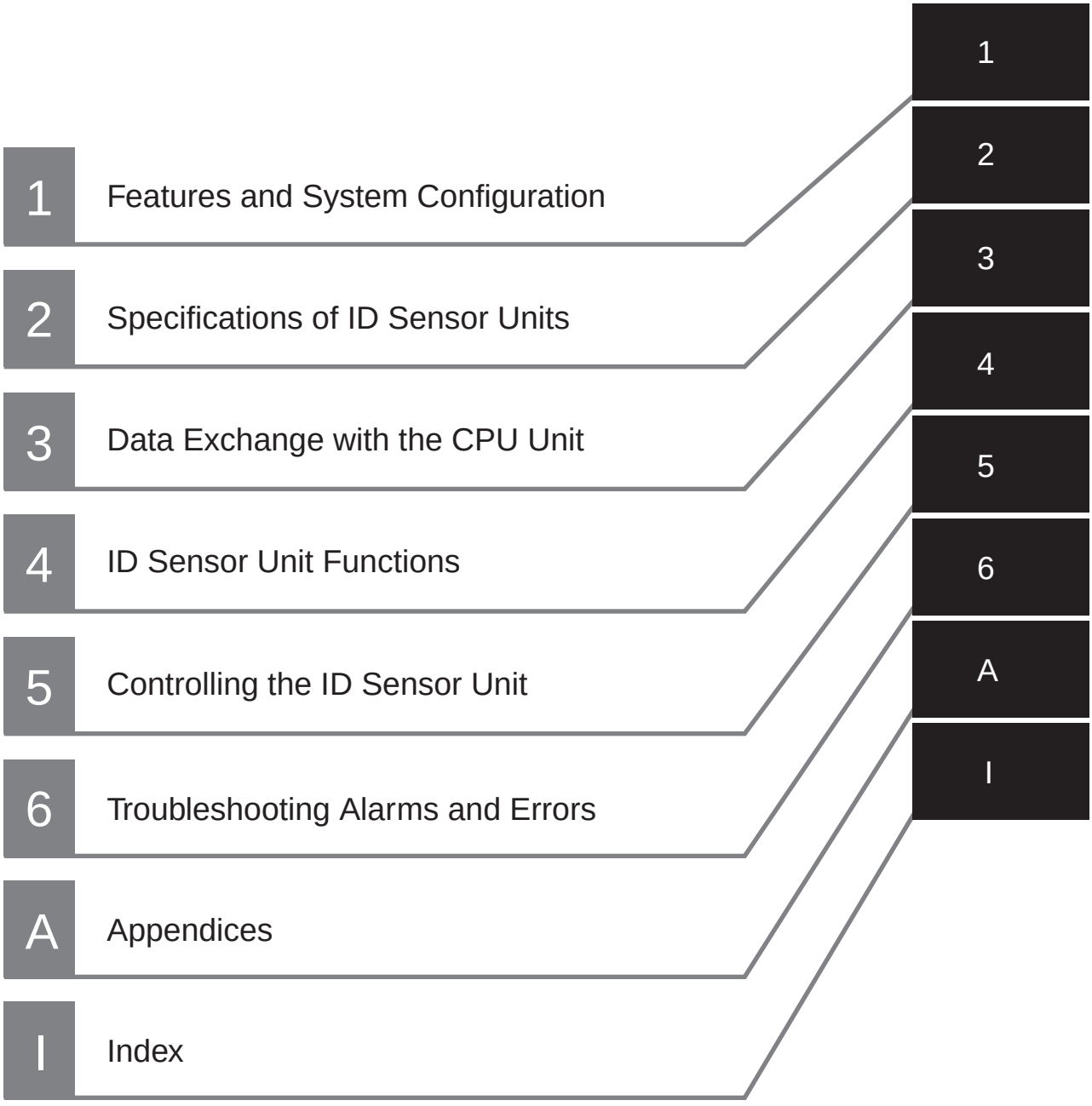
Note References are provided to more detailed or related information.

Precaution on Terminology

In this manual, “download” refers to transferring data from the Sysmac Studio to the physical Controller and “upload” refers to transferring data from the physical Controller to the Sysmac Studio.

For the Sysmac Studio, synchronization is used to both upload and download data. Here, “synchronize” means to automatically compare the data for the Sysmac Studio on the computer with the data in the physical Controller and transfer the data in the direction that is specified by the user.

Sections in this Manual



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Read and Understand this Manual

Please read and understand this manual before using the products. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

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In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Safety Precautions

Definition of Precautionary Information

The following notation is used in this manual to provide precautions required to ensure safe usage of a CJ-series ID Sensor Unit. The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.
The following notation is used.

WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.
Caution	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

Precautions for Safe Use
Indicates precautions on what to do and what not to do to ensure safe usage of the product.

Precautions for Correct Use
Indicates precautions on what to do and what not to do to ensure proper operation and performance.

Symbols

The circle and slash symbol indicates operations that you must not do.
The specific operation is shown in the circle and explained in text.
This example indicates prohibiting disassembly.

The triangle symbol indicates precautions (including warnings).
The specific operation is shown in the triangle and explained in text.
This example indicates a precaution for electric shock.

The triangle symbol indicates precautions (including warnings).
The specific operation is shown in the triangle and explained in text.
This example indicates a general precaution.

The filled circle symbol indicates operations that you must do.
The specific operation is shown in the circle and explained in text.
This example shows a general precaution for something that you must do.

⚠ WARNING

During Power Supply

Do not touch any of the terminals or terminal blocks while the power is being supplied. Doing so may result in electric shock.

Do not attempt to take any Unit apart. In particular, high-voltage parts are present in the Power Supply Unit while power is supplied or immediately after power is turned OFF. Touching any of these parts may result in electric shock. There are sharp parts inside the Unit that may cause injury.

Fail-safe Measures

Provide safety measures in external circuits to ensure safety in the system if an abnormality occurs due to malfunction of the CPU Unit, other Units, or slaves or due to other external factors affecting operation. Not doing so may result in serious accidents due to incorrect operation.

Emergency stop circuits, interlock circuits, limit circuits, and similar safety measures must be provided in external control circuits.

The Controller outputs may remain ON or OFF due to deposition or burning of the output relays or destruction of the output transistors. As a countermeasure for such problems, external safety measures must be provided to ensure safe operation of the system.

The CPU Unit will turn OFF all outputs from Basic Output Units in the following cases. The remote I/O slaves will operate according to the settings in the slaves.

- If an error occurs in the power supply
- If the power supply connection becomes faulty
- If a CPU watchdog timer error or CPU reset occurs
- If a major fault level Controller error occurs
- While the CPU Unit is on standby until RUN mode is entered after the power is turned ON

External safety measures must be provided to ensure safe operation of the system in such cases.

If external power supplies for slaves or other devices are overloaded or short-circuited, the voltage will drop, outputs will turn OFF, and the system may be unable to read inputs. Provide external safety measures in controls with monitoring of external power supply voltage as required so that the system operates safely in such a case.

⚠ WARNING

Fail-safe Measures

Unintended outputs may occur when an error occurs in variable memory or in memory used for CJ-series Units. As a countermeasure for such problems, external safety measures must be provided to ensure safe operation of the system.

Provide measures in the communications system and user program to ensure safety in the overall system even if errors or malfunctions occur in data link communications or remote I/O communications.

If there is interference in remote I/O communications or if a major fault level error occurs, output status will depend on the products that are used. Confirm the operation that will occur when there is interference in communications or a major fault level error, and implement safety measures. Correctly set all of the EtherCAT slaves.

The NJ-series Controller continues normal operation for a certain period of time when a momentary power interruption occurs. This means that the NJ-series Controller may receive incorrect signals from external devices that are also affected by the power interruption. Accordingly, take suitable actions, such as external fail-safe measures and interlock conditions, to monitor the power supply voltage of the external device as required.

You must take fail-safe measures to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causes. Not doing so may result in serious accidents due to incorrect operation.

Voltage and Current Inputs

Make sure that the voltages and currents that are input to the Units and slaves are within the specified ranges.
Inputting voltages or currents that are outside of the specified ranges may cause accidents or fire.

Downloading

Always confirm safety at the destination before you transfer a user program, configuration data, setup data, device variables, or values in memory used for CJ-series Units from the Sysmac Studio. The devices or machines may perform unexpected operation regardless of the operating mode of the CPU Unit.

⚠ Caution

Application

Do not touch any Unit when power is being supplied or immediately after the power supply is turned OFF. Doing so may result in burn injury.

Wiring

Be sure that all terminal screws and cable connector screws are tightened to the torque specified in the relevant manuals. The loose screws may result in fire or malfunction.

Online Editing

Execute online editing only after confirming that no adverse effects will be caused by deviations in the timing of I/O. If you perform online editing, the task execution time may exceed the task period, I/O may not be refreshed with external devices, input signals may not be read, and output timing may change.

Precautions for Safe Use

Disassembly and Dropping

- Do not attempt to disassemble, repair, or modify any Units. Doing so may result in malfunction or fire.
- Do not drop any Unit or subject it to abnormal vibration or shock. Doing so may result in Unit malfunction or burning.

Mounting

- The sliders on the tops and bottoms of the Power Supply Unit, CPU Unit, I/O Units, and other Units must be completely locked (until they click into place) after connecting the adjacent Unit connectors.

Installation

- Always connect to a ground of 100 Ω or less when installing the Units. A ground of 100 Ω or less must be installed when shorting the GR and LG terminals on the Power Supply Unit.

Wiring

- Follow the instructions in this manual to correctly perform wiring.
  Double-check all wiring and switch settings before turning ON the power supply.
- Use crimp terminals for wiring.
  Do not connect bare stranded wires directly to terminals.
- Do not pull on the cables or bend the cables beyond their natural limit.
  Do not place heavy objects on top of the cables or other wiring lines. Doing so may break the cables.
- Mount terminal blocks and connectors only after checking the mounting location carefully.
- Be sure that the terminal blocks, expansion cables, and other items with locking devices are properly locked into place.
- Always remove any dustproof labels that are on the top of the Units when they are shipped before you turn ON the power supply. If the labels are not removed, heat will accumulate and malfunctions may occur.
- Before you connect a computer to the CPU Unit, disconnect the power supply plug of the computer from the AC outlet. Also, if the computer has an FG terminal, make the connections so that the FG terminal has the same electrical potential as the GR terminal on the Power Supply Unit. A difference in electric potential between the computer and Controller may cause failure or malfunction.
- If the external power supply to an Output Unit or slave has polarity, connect it with the correct polarity. If the polarity is reversed, current may flow in the reverse direction and damage the connected devices regardless of the operation of the Controller.

Power Supply Design

- Do not exceed the rated supply capacity of the Power Supply Units in the NJ-series Controller. The rated supply capacities are given in the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500).
  If the capacity is exceeded, operation may stop, malfunctions may occur, or data may not be backed up normally for power interruptions.
  Use NJ-series Power Supply Units for both the NJ-series CPU Rack and Expansion Racks.
  Operation is not possible if a CJ-series Power Supply Unit is used with an NJ-series CPU Unit or an NJ-series Power Supply Unit is used with a CJ-series CPU Unit.

- Do not apply voltages or connect loads to the Output Units or slaves in excess of the maximum ratings.
- Surge current occurs when the power supply is turned ON. When selecting fuses or breakers for external circuits, consider the above precaution and allow sufficient margin in shut-off performance. Refer to the relevant manuals for surge current specifications. Refer to the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500) for surge current specifications.
- If the full dielectric strength voltage is applied or turned OFF using the switch on the tester, the generated impulse voltage may damage the Power Supply Unit. Use the adjustment on the tester to gradually increase and decrease the voltage.
- Apply the voltage between the Power Supply Unit's L1 or L2 terminal and the GR terminal when testing insulation and dielectric strength.
- Do not supply AC power from an inverter or other device with a square-wave output. Internal temperature rise may result in smoking or burning. Always input a sinusoidal wave with the frequency that is given in the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500).
- Install external breakers and take other safety measures against short-circuiting in external wiring.

Turning ON the Power Supply

- It takes up to approximately 10 to 20 s to enter RUN mode after the power is turned ON. During that time, outputs will be OFF or will be the values specified in the Unit or slave settings, and external communications cannot be performed. Use the RUN output on the Power Supply Unit, for example, to implement fail-safe circuits so that external devices do not operate incorrectly.
- Configure the external circuits so that the power supply to the control system turns ON only after the power supply to the Controller has turned ON. If the power supply to the Controller is turned ON after the control power supply, temporary errors may result in incorrect control system signals because the output terminals on Output Units may momentarily turn ON when power supply is turned ON to the Controller.
- If you transfer data from a backup file on an SD Memory Card to the Controller when the power supply is turned ON, properly select the data groups to transfer. If the data for an unintended data group is transferred to the Controller, it may cause the equipment to operate unpredictably.

Actual Operation

- Check the user program, data, and parameter settings for proper execution before you use them for actual operation.

Turning OFF the Power Supply

- Never turn OFF the power supply to the Controller when the BUSY indicator is flashing. While the BUSY indicator is lit, the user program and settings in the CPU Unit are being backed up in the built-in non-volatile memory. This data will not be backed up correctly if the power supply is turned OFF. Also, a major fault level Controller error will occur the next time you start operation, and operation will stop.
- Do not turn OFF the power supply or remove the SD Memory Card while SD Memory Card access is in progress (i.e., while the SD BUSY indicator flashes). Data may become corrupted, and the Controller will not operate correctly if it uses corrupted data. To remove the SD Memory Card from the CPU Unit while the power supply is ON, press the SD Memory Card power supply switch and wait for the SD BUSY indicator to turn OFF before you remove the SD Memory Card.
- Do not disconnect the cable or turn OFF the power supply to the Controller when downloading data or the user program from Support Software.
- Always turn OFF the power supply to the Controller before you attempt any of the following.
  - Mounting or removing I/O Units or the CPU Unit
  - Assembling the Units
  - Setting DIP switches or rotary switches

- Connecting cables or wiring the system
- Connecting or disconnecting the connectors

The Power Supply Unit may continue to supply power to the rest of the Controller for a few seconds after the power supply turns OFF. The PWR indicator is lit during this time. Confirm that the PWR indicator is not lit before you perform any of the above.

Operation

- Confirm that no adverse effect will occur in the system before you attempt any of the following.
  - Changing the operating mode of the CPU Unit (including changing the setting of the Operating Mode at Startup)
  - Changing the user program or settings
  - Changing set values or present values
  - Forced refreshing
- Always sufficiently check the safety at the connected devices before you change the settings of an EtherCAT slave or Special Unit.
- If two different function modules are used together, such as when you use CJ-series Basic Output Units and EtherCAT slave outputs, take suitable measures in the user program and external controls to ensure that safety is maintained in the controlled system if one of the function modules stops. The relevant outputs will stop if a partial fault level error occurs in one of the function modules.
- Always confirm safety at the connected equipment before you reset Controller errors with an event level of partial fault or higher for the EtherCAT Master Function Module.
  When the error is reset, all slaves that were in any state other than Operational state due to a Controller error with an event level of partial fault or higher (in which outputs are disabled) will go to Operational state and the outputs will be enabled.
  Before you reset all errors, confirm that no Controller errors with an event level of partial fault have occurred for the EtherCAT Master Function Module.
- Always confirm safety at the connected equipment before you reset Controller errors for a CJ-series Special Unit. When a Controller error is reset, the Unit where the Controller error with an event level of observation or higher will be restarted.
  Before you reset all errors, confirm that no Controller errors with an event level of observation or higher have occurred for the CJ-series Special Unit. Observation level events do not appear on the Controller Error Tab Page, so it is possible that you may restart the CJ-series Special Unit without intending to do so.
  You can check the status of the *_CJB_UnitErrSta[0,0]* to *_CJB_UnitErrSta[3,9]* error status variables on a Watch Tab Page to see if an observation level Controller error has occurred.

Battery Backup

- The user program and initial values for the variables are stored in non-volatile memory in the CPU Unit. The present values of variables with the Retain attribute and the values of the Holding, DM, and EM Areas in the memory used for CJ-series Units are backed up by a Battery. If the Battery is not connected or the Battery is exhausted, the CPU Unit detects a Battery-backup Memory Check Error. If that error is detected, variables with a Retain attribute are set to their initial values and the Holding, DM, and EM Areas in memory used for CJ-series Units are cleared to all zeros. Perform thorough verifications and provide sufficient measures to ensure that the devices perform safe operation for the initial values of the variables with Retain attributes and the resulting operation.

Debugging

- Forced refreshing ignores the results of user program execution and refreshes I/O with the specified values. If forced refreshing is used for inputs for which I/O refreshing is not supported, the inputs will first take the specified values, but they will then be overwritten by the user program. This operation differs from the force-set/reset functionality of the CJ-series PLCs.

- You cannot upload or download information for forced refreshing with the Sysmac Studio.
  After downloading data that contains forced refreshing, change to RUN mode and then use the Sysmac Studio to perform the operation for forced refreshing.
  Depending on the difference in the forced status, the control system may operate unexpectedly.
- Do not specify the same address for the AT specification for more than one variable.
  Doing so would allow the same entity to be accessed with different variable names, which would make the user program more difficult to understand and possibly cause programming mistakes.

General Communications

- When you use data link communications, check the error information that is given in *ErrSta* (Controller Error Status) to make sure that no error has occurred in the source device. Write the user program to use the received data only if there is no error. If there is an error in the source device, the data for the data link may contain incorrect values.
- Unexpected operation may result if inappropriate data link tables are set. Even if appropriate data link tables have been set, confirm that the controlled system will not be adversely affected before you transfer the data link tables. The data links start automatically after the data link tables are transferred.
- All CPU Bus Units are restarted when routing tables are transferred from Support Software to the CPU Unit. Confirm that the system will not be adversely affected by restarting before you transfer the routing tables.
- Tag data links will stop between related nodes while tag data link parameters are transferred during Controller operation. Confirm that the system will not be adversely affected before you transfer the tag data link parameters.

EtherNet/IP Communications

- All related EtherNet/IP nodes are reset when you transfer settings for the built-in EtherNet/IP port (including IP addresses and tag data links settings). Confirm that the system will not be adversely affected by resetting nodes before you transfer the settings.
- If EtherNet/IP tag data links (cyclic communications) are used with a repeating hub, the communications load on the network will increase. This will increase collisions and may prevent stable communications. Do not use repeating hubs on networks where tag data links are used. Use an Ethernet switch instead.

EtherCAT Communications

- Make sure that the communications distance, number of nodes connected, and method of connection for EtherCAT are within specifications.
  Do not connect EtherCAT communications to EtherNet/IP, a standard in-house LAN, or other networks. An overload may cause the network to fail or malfunction.
- Malfunctions or unexpected operation may occur for some combinations of EtherCAT revisions of the master and slaves. If you disable the revision check in the network settings, use the Sysmac Studio to check the slave revision settings in the master and the actual slave revisions, and then make sure that functionality is compatible in the slave manuals or other references. You can check the actual slave revisions from the Sysmac Studio or on slave nameplates.
- After you transfer the user program, the CPU Unit is restarted and communications with the EtherCAT slaves are cut off. During that period, the slave outputs behave according to the slave settings. The time that communications are cut off depends on the EtherCAT network configuration. If the EtherCAT network configuration contains only OMRON EtherCAT slaves, communications are cut off for a maximum of 45 seconds.
  Before you transfer the user program, confirm that the system will not be adversely affected.

- If the Fail-soft Operation parameter is set to stop operation, process data communications will stop for all slaves when an EtherCAT communications error is detected in a slave. For this reason, if Servo Drives are connected, the Servos for all axes will be turned OFF. Make sure that the Fail-soft Operation parameter setting results in safe operation when a device error occurs.
- EtherCAT communications are not always established immediately after the power supply is turned ON. Use the system-defined variables in the user program to confirm that communications are established before attempting control operations.
- If frames sent to EtherCAT slaves are lost due to noise or other causes, slave I/O data is not communicated, and the intended operation is sometimes not achieved. If noise countermeasures are required, use the *_EC_InDataInvalid* (Input Data Disable) system-defined variable as an interlock condition in the user program.
  Refer to the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) for details.
  The slave outputs behave according to the slave settings. Refer to the manuals for the slaves for details.
- When an EtherCAT slave is disconnected, communications will stop and control of the outputs will be lost not only for the disconnected slave, but for all slaves connected after it. Confirm that the system will not be adversely affected before you disconnect a slave.
- If you disconnect the cable from an EtherCAT slave to disconnect it from the network, any current communications frames may be lost. If frames are lost, slave I/O data is not communicated, and the intended operation is sometimes not achieved. Perform the following processing for a slave that needs to be replaced.
  - Program the *_EC_InDataInvalid* (Input Data Disable) system-defined variable as an interlock condition.
  - Set the Impermissible Number of Continuous Timeouts setting in the EtherCAT master to at least 2.

  Refer to the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) for details.

Motion Control

- Confirm the axis number carefully before you perform an MC Test Run.
- The motor is stopped if communications are interrupted between the Sysmac Studio and the CPU Unit during an MC Test Run. Connect the communications cable between the computer and CPU Unit securely and confirm that the system will not be adversely affected before you perform an MC Test Run.
- Always execute the Save Cam Table instruction if you change any of the cam data from the user program in the CPU Unit or from the Sysmac Studio. If the cam data is not saved, the previous condition will be restored when the power is turned ON again, possibly causing unexpected machine operation.
- The positive drive prohibit input (POT), negative drive prohibit input (NOT), and home proximity input (DEC) of the Servo Drive are used by the MC Function Module as the positive limit input, negative limit input, and home proximity input. Make sure that the signal widths for all of these input signals are longer than the control period of the MC Function Module. If the input signal widths are shorter than the control period, the MC Function Module may not be able to detect the input signals, resulting in incorrect operation.

Battery Replacement

- The Battery may leak, rupture, heat, or ignite. Never short-circuit, charge, disassemble, heat, or incinerate the Battery or subject it to strong shock.
- Dispose of any Battery that has been dropped on the floor or otherwise subjected to excessive shock. Batteries that have been subjected to shock may leak if they are used.
- UL standards require that only an experienced engineer replace the Battery. Make sure that an experienced engineer is in charge of Battery replacement.

- Apply power for at least five minutes before changing the Battery. Install a new Battery within five minutes (at 25°C) of turning OFF the power supply. If power is not supplied for at least 5 minutes, the saved data may be lost.

Unit Replacement

- We recommend replacing the Battery with the power turned OFF to prevent the CPU Unit's sensitive internal components from being damaged by static electricity and to prevent malfunctions. The Battery can be replaced without turning OFF the power supply. To do so, always touch a grounded piece of metal to discharge static electricity from your body before you start the procedure.
  After you replace the Battery, connect the Sysmac Studio and clear the Low Battery Voltage error.
- Make sure that the required data, including the user program, configurations, settings, variables, and memory used for CJ-series Units, is transferred to a CPU Unit that was replaced and to externally connected devices before restarting operation.
  Be sure to include the routing tables, network parameters, and other CPU Bus Unit data, which are stored in the CPU Unit.

Disposal

- Dispose of the product and Batteries according to local ordinances as they apply.

- The following information must be displayed for all products that contain primary lithium batteries with a perchlorate content of 6 ppb or higher when shipped to or transported through the State of California, USA.
  Perchlorate Material - special handling may apply.
  See www.dtsc.ca.gov/hazardouswaste/perchlorate.
- The CPU Unit contains a primary lithium battery with a perchlorate content of 6 ppb or higher. Place the above information on the individual boxes and shipping boxes when shipping finished products that contain a CPU Unit to the State of California, USA.

When using ID Sensor Unit

- Do not allow water or wires to enter the Product through gaps in the case. Otherwise, fire or electric shock may occur.
- Turn OFF the power to the Product before attaching or removing an Amplifier or Antenna.
- If multiple Antennas are mounted near each other, communications performance may decrease due to mutual interference. Refer to information on installing Antenna in the RFID System V680 Series User's Manual for Amplifiers, Antennas, and ID Tags (FRAM) (Cat. No. Z248), V680 Series RFID System Amplifier/Tags (EEPROM) User's Manual (Cat. No. Z262), and Heat-resistive RFID System V680 Series User's Manual (Cat. No. Z221) and check to make sure there is no mutual interference.
- If an error is detected in the Product, immediately stop operation and turn OFF the power supply. Consult with an OMRON representative.
- Dispose of the Product as industrial waste.
- Observe all warnings and precautions given in the body of this manual.
- Do not use thinners, benzenes, acetones, and kerosenes for cleaning.

Precautions for Correct Use

Storage, Mounting, and Wiring

- Do not operate or store the Controller in the following locations. Operation may stop or malfunctions may occur.
  - Locations subject to direct sunlight
  - Locations subject to temperatures or humidity outside the range specified in the specifications
  - Locations subject to condensation as the result of severe changes in temperature
  - Locations subject to corrosive or flammable gases
  - Locations subject to dust (especially iron dust) or salts
  - Locations subject to exposure to water, oil, or chemicals
  - Locations subject to shock or vibration
- Take appropriate and sufficient countermeasures when installing the Controller in the following locations.
  - Locations subject to strong, high-frequency noise
  - Locations subject to static electricity or other forms of noise
  - Locations subject to strong electromagnetic fields
  - Locations subject to possible exposure to radioactivity
  - Locations close to power lines
- Before touching a Unit, be sure to first touch a grounded metallic object in order to discharge any static build-up.
- Install the Controller away from sources of heat and ensure proper ventilation. Not doing so may result in malfunction, in operation stopping, or in burning.
- An I/O bus check error will occur and the Controller will stop if an I/O Connecting Cable's connector is disconnected from the Rack. Be sure that the connectors are secure.
- Do not allow foreign matter to enter the openings in the Unit. Doing so may result in Unit burning, electric shock, or failure.
- Do not allow wire clippings, shavings, or other foreign material to enter any Unit. Otherwise, Unit burning, failure, or malfunction may occur. Cover the Units or take other suitable countermeasures, especially during wiring work.
- For EtherCAT and EtherNet/IP, use the connection methods and cables that are specified in the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) and the *NJ-series CPU Unit Built-in EtherNet/IP Port User's Manual* (Cat. No. W506). Otherwise, communications may be faulty.
- Use the rated power supply voltage for the Power Supply Units. Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied in places where the power supply is unstable.
- Make sure that the current capacity of the wire is sufficient. Otherwise, excessive heat may be generated. When cross-wiring terminals, the total current for all the terminals will flow in the wire. When wiring cross-overs, make sure that the current capacity of each of the wires is not exceeded.
- Do not touch the terminals on the Power Supply Unit immediately after turning OFF the power supply. Residual voltage may cause electrical shock.
- If you use reed switches for the input contacts for AC Input Units, use switches with a current capacity of 1 A or greater.
  If the capacity of the reed switches is too low, surge current may fuse the contacts.

Error Processing

- In applications that use the results of instructions that read the error status, consider the affect on the system when errors are detected and program error processing accordingly. For example, even the detection of a minor error, such as Battery replacement during operation, can affect the system depending on how the user program is written.
- If you change the event level of a Controller error, the output status when the error occurs may also change. Confirm safety before you change an event level.

Restoring and Automatically Transferring Data

- When you edit the restore command file or the automatic transfer command file, do not change anything in the file except for the “yes” and “no” specifications for the selectable data groups. If you change anything else in the file, the Controller may perform unexpected operation when you restore or automatically transfer the data.

Unit Replacement

- If you replace a CPU Bus Unit or Special I/O Unit, refer to operation manual for the Unit for information on the data required for individual Units and redo the necessary settings.
- The absolute encoder home offset is backed up with a Battery in the CPU Unit.
  When you change the combination of the CPU Unit and Servomotor, e.g., when you add or replace a Servomotor, define home again.
  To restore the information without changing the CPU Unit-Servomotor combination, remove the absolute encoder home offset from the data to restore.

Task Settings

- If a Task Period Exceeded error occurs, shorten the programs to fit in the task period or increase the setting of the task period.

Motion Control

- Use the system-defined variable in the user program to confirm that EtherCAT communications are established before you attempt to execute motion control instructions. Motion control instructions are not executed normally if EtherCAT communications are not established.
- Use the system-defined variables to monitor for errors in communications with the slaves that are controlled by the motion control function module. Motion control instructions are not executed normally if an error occur in slave communications.
- Before you start an MC Test Run, make sure that the operation parameters are set correctly.
- Do not download motion control settings during an MC Test Run.

EtherCAT Communications

- Do not disconnect the EtherCAT slave cables during operation. The outputs will become unstable.
- Set the Servo Drives to stop operation if an error occurs in EtherCAT communications between the Controller and a Servo Drive.
- Make sure that all of the slaves to be restored are participating in the network before you reset a Network Configuration Verification Error, Process Data Communications Error, or Link OFF Error in the EtherCAT Master Function Module. If any slave is not participating when any of these errors is reset, the EtherCAT Master Function Module may access slave with a different node address than the specified node address or the error may not be reset correctly.

Battery Replacement

- Be sure to install a replacement Battery within two years of the production date shown on the Battery label.
- Turn ON the power after replacing the Battery for a CPU Unit that has been unused for a long time. Leaving the CPU Unit unused again without turning ON the power even once after the Battery is replaced may result in a shorter Battery life.
- When you replace the Battery, use the CJ1W-BAT01 Battery Set.

SD Memory Cards

- Insert the SD Memory Card all the way.
- Do not turn OFF the power supply to the Controller during SD Memory Card access. The files may be corrupted.
  If there is a corrupted file in the SD Memory Card, the file is automatically deleted by the restoration function when the power supply is turned ON.

When installing ID Sensor Unit

- This Product uses a frequency band of 13.56 MHz to communicate with ID Tags. Some transceivers, motors, inverters, switching power supplies, etc., generate electrical noise that will affect these communications. If any of these devices are located in the vicinity of the Product, they may affect communications with ID Tags, and may possibly damage the ID Tags. Prior to using the Product in the vicinity of any of these devices, perform a test to determine whether the Product can be used under the resulting influence.
- The Product is not waterproof. Do not use it in an environment where mist is present.
- Do not expose the Product to chemicals that adversely affect the Product materials.

Regulations and Standards

Conformance to EC Directives

Applicable Directives

- EMC Directives
- Low Voltage Directive

Concepts

● EMC Directive

OMRON devices that comply with EC Directives also conform to the related EMC standards so that they can be more easily built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards.*
Whether the products conform to the standards in the system used by the customer, however, must be checked by the customer. EMC-related performance of the OMRON devices that comply with EC Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.

* Applicable EMC (Electromagnetic Compatibility) standards are as follows:
EMS (Electromagnetic Susceptibility): EN 61131-2 and EN 61000-6-2
EMI (Electromagnetic Interference): EN 61131-2 and EN 61000-6-4 (Radiated emission: 10-m regulations)

● Low Voltage Directive

Always ensure that devices operating at voltages of 50 to 1,000 VAC and 75 to 1,500 VDC meet the required safety standards. The applicable directive is EN 61131-2.

● Conformance to EC Directives

The NJ-series Controllers comply with EC Directives. To ensure that the machine or device in which the NJ-series Controller is used complies with EC Directives, the Controller must be installed as follows:

- The NJ-series Controller must be installed within a control panel.
- You must use reinforced insulation or double insulation for the DC power supplies connected to DC Power Supply Units and I/O Units.
- NJ-series Controllers that comply with EC Directives also conform to the Common Emission Standard (EN 61000-6-4). Radiated emission characteristics (10-m regulations) may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions.
  You must therefore confirm that the overall machine or equipment complies with EC Directives.

- Connect to either circuit type (1) or (2) listed below.
  (1) Limited Voltage/Current Circuit (Approved under UL 508)
  A circuit that uses the secondary windings of an isolation transformer as its power supply and fulfills the following conditions:
  - Maximum voltage (with no load): 30 Vrms (42.4 V peak)
    and
  - Maximum current: (a) 8 A (including short-circuits) or

(b) Current limited by a circuit protection device (e.g., fuse) with the ratings listed in the following table.

No-load voltage (Vrms)	Maximum current rating (A)
0 to 20	5.0
Over 20 to 30	$\frac{100}{\text{Peak voltage}}$

(2) A class 2 circuit with a maximum voltage of 30 Vrms (42.4 V peak) that uses a class 2 power supply conforming to UL 1310 or a class 2 transformer conforming to UL 1585 as its power source.

Conformance to Shipbuilding Standards

The NJ-series Controllers comply with the following shipbuilding standards. Applicability to the shipbuilding standards is based on certain usage conditions. It may not be possible to use the product in some locations. Contact your OMRON representative before attempting to use a Controller on a ship.

Usage Conditions for NK and LR Shipbuilding Standards

- The NJ-series Controller must be installed within a control panel.
- Gaps in the door to the control panel must be completely filled or covered with gaskets or other material.
- The following noise filter must be connected to the power supply line.

Noise Filter

Manufacturer	Model
Cosel Co., Ltd.	TAH-06-683

Trademarks

- Sysmac and SYSMAC are trademarks or registered trademarks of OMRON Corporation in Japan and other countries for OMRON factory automation products.
- Windows, Windows 98, Windows XP, Windows Vista, and Windows 7 are registered trademarks of Microsoft Corporation in the USA and other countries.
- EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
- The SD logo is a trademark of SD-3C, LLC.

Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.

Unit Versions

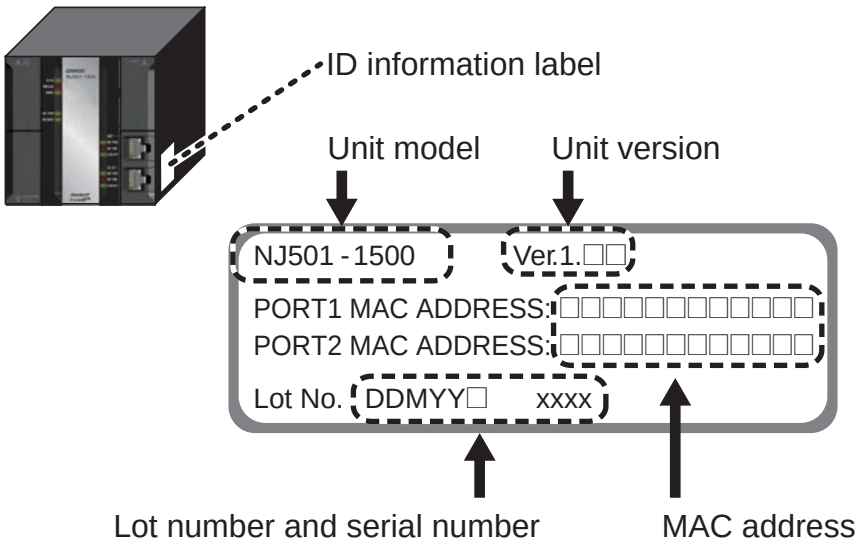
Unit Versions

A “unit version” has been introduced to manage CPU Units in the NJ Series according to differences in functionality accompanying Unit upgrades.

Notation of Unit Versions on Products

The unit version is given on the ID information label of the products for which unit versions are managed, as shown below.

Example for NJ-series NJ501-□□□□ CPU Unit:



The following information is provided on the ID information label.

Item	Description
Unit model	Gives the model of the Unit.
Unit version	Gives the unit version of the Unit.
Lot number and serial number	Gives the lot number and serial number of the Unit. DDMYY: Lot number, □: For use by OMRON, xxxx: Serial number “M” gives the month (1 to 9: January to September, X: October, Y: November, Z: December)
MAC address	Gives the MAC address of the built-in port on the Unit.

Confirming Unit Versions with Sysmac Studio

You can use the Unit Production Information on the Sysmac Studio to check the unit version of the CPU Unit, CJ-series Special I/O Units, CJ-series CPU Bus Units, and EtherCAT slaves. The unit versions of CJ-series Basic I/O Units cannot be checked from the Sysmac Studio.

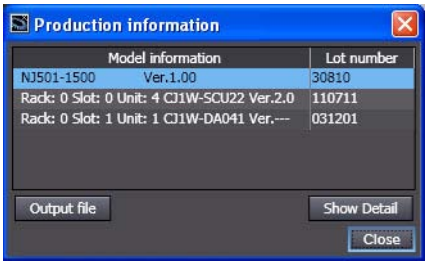
● CPU Unit and CJ-series Units

1 Double-click **CPU/Expansion Racks** under **Configurations and Setup** in the Multiview Explorer. Or, right-click **CPU/Expansion Racks** under **Configurations and Setup** and select ***Edit*** from the menu.

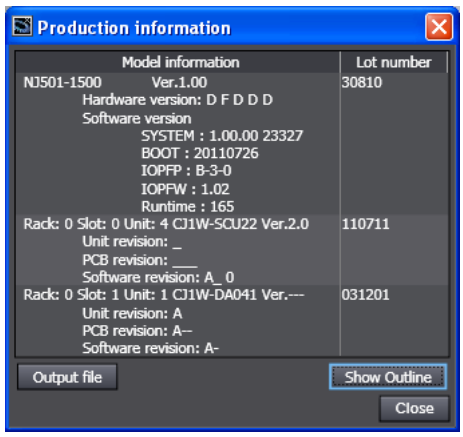
The Unit Editor is displayed for the Controller Configurations and Setup layer.

2 Right-click any open space in the Unit Editor and select ***Production Information***.

The Production Information Dialog Box is displayed.



Simple Display



Detailed Display

In this example, “Ver.1.00” is displayed next to the unit model.

The following items are displayed.

CPU Unit	CJ-series Units
Unit model	Unit model
Unit version	Unit version
Lot number	Lot number
	Rack number, slot number, and unit number

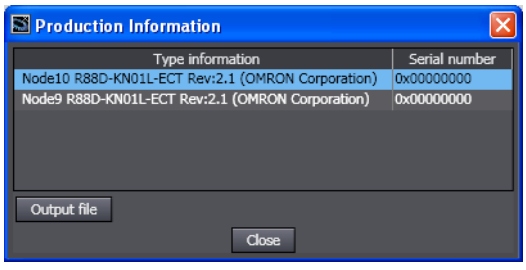
● EtherCAT Slaves

1 Double-click **EtherCAT** under **Configurations and Setup** in the Multiview Explorer. Or, right-click **EtherCAT** under **Configurations and Setup** and select ***Edit*** from the menu.

The EtherCAT Configuration Tab Page is displayed for the Controller Configurations and Setup layer.

2 Right-click the master in the EtherCAT Configurations Editing Pane and select **Display Production Information**.

The Production Information Dialog Box is displayed.



The following items are displayed.
Node address
Type information*
Serial number

* If the model number cannot be determined (such as when there is no ESI file), the vendor ID, product code, and revision number are displayed.

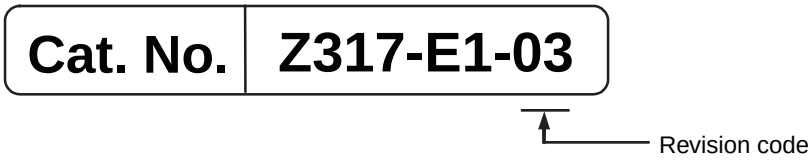
Related Manuals

The following manuals are related to the NJ-series Controllers. Use these manuals for reference.

Manual name	Cat. No.	Model numbers	Application	Description
NJ-series CPU Unit Hardware User's Manual	W500	NJ501-□□□□ NJ301-□□□□	Learning the basic specifications of the NJ-series CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NJ-series system is provided along with the following information on the CPU Unit. • Features and system configuration • Introduction • Part names and functions • General specifications • Installation and wiring • Maintenance and inspection Use this manual together with the *NJ-series CPU Unit Software User's Manual* (Cat. No. W501).
NJ-series CPU Unit Software User's Manual	W501	NJ501-□□□□ NJ301-□□□□	Learning how to program and set up an NJ-series CPU Unit. Mainly software information is provided.	The following information is provided on a Controller built with an NJ501 CPU Unit. • CPU Unit operation • CPU Unit features • Initial settings • Programming based on IEC 61131-3 language specifications Use this manual together with the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500).
Sysmac Studio Version 1 Operation Manual	W504	SYSMAC-SE2□□□	Learning about the operating procedures and functions of the Sysmac Studio.	Describes the operating procedures of the Sysmac Studio.
CJ-series ID Sensor Units Operation Manual for NJ-series CPU Unit (This manual)	Z317	CJ1W-V680C11 CJ1W-V680C12	Information on using V680 Series ID Sensor Units for CJ-series with NJ Series CPU Unit.	Provides information on functions and settings to use V680 Series ID Sensor Unit with NJ Series CPU Unit.
RFID System V680 Series User's Manual for Amplifiers, Antennas, and ID Tags (FRAM)	Z248		Information on using RFID System V680 Series Amplifiers, Antennas, and ID Tags	Provides information on functions and settings to use V680 Series Amplifiers, Antennas, and ID Tags.
RFID System V680 Series User's Manual for Amplifiers, Antennas, and ID Tags (EEPROM)	Z262		Information on using RFID System V680 Series Amplifiers, Antennas, and ID Tags	Provides information on functions and settings to use V680 Series Amplifiers, Antennas, and ID Tags.
Heat-resistive RFID System V680 Series User's Manual	Z221		Information on using Heat-resistive RFID System V680 Series	Provides information on functions and settings to use Heat-resistive RFID System V680 Series.
RFID System V680 Series ID Sensor Units User's Manual	Z271	CS1W-V680C11 CS1W-V680C12 CJ1W-V680C11 CJ1W-V680C12	Information on using V680 Series ID Sensor Unit. For CS/CJ Series.	Provides information on functions and settings to use V680 Series ID Sensor Unit with CS/CJ Series CPU Unit.

Revision History

A manual revision code appears as a suffix to the catalog number on the front and back covers of the manual.



Revision code	Date	Revised content
01	July 2011	Original production
02	March 2012	Corrected errors.
03	August 2012	Made changes accompanying release of unit version 1.03 of the CPU Unit.

1

Features and System Configuration

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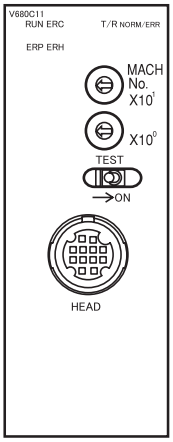
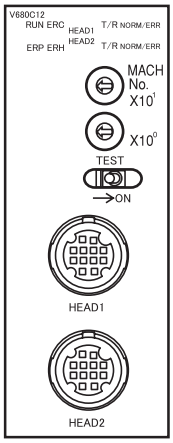
1-1 Outline of Features and Functions

● ID Sensor Units

One-channel ID Sensor Unit
(CJ1W-V680C11)



Two-channels ID Sensor Unit
(CJ1W-V680C12)



These ID Sensor Units are used in NJ-series PLCs to read and write data for V680-series ID Tags. There are two models: a One-channel ID Sensor Unit (CJ1W-V680C11) and a Two-channels ID Sensor Unit (CJ1W-V680C12).

	CJ1W-V680C11	CJ1W-V680C12
Amplifier/ Antennas	V680 Series (V680-HA63□/V680-H□□)	
Maximum number of connected Antennas	1	2
ID Tags	V680 Series (V680-D□□F□□ or V680-D□□P□□)	
Commands	Read Write Bit Set Bit Clear Mask Bit Write Calculation Write Data Fill Data Check Number of Writes Control Read with Error Correction Write with Error Correction UID Read Noise Measurement	Read Write Bit Set Bit Clear Mask Bit Write Calculation Write Data Fill Data Check Number of Writes Control Copy Read with Error Correction Write with Error Correction UID Read Noise Measurement

- An RFID system consists of an ID Sensor Unit in a NJ-series CPU Rack or Expansion Rack, one or two Antennas connected to the ID Sensor Unit, and ID Tags connected to moving bodies.
- The ID Sensor Unit writes data from the NJ-series CPU Unit to the ID Tags through the Antennas and read data from the ID Tags to the NJ-series CPU Unit.

Differences between Version 1.2 and Earlier Version

The following functions have been added to version 1.2 in comparison to the earlier version. Functions are upwardly compatible, so ID Sensor Units with an earlier version can be replaced with version 1.2.

● CA1D Mode Setting Added for ID Tag Memory

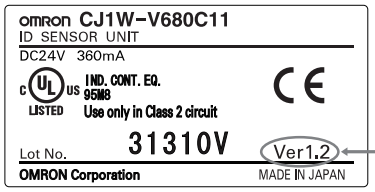
If you are using a V680-CA1D/-CA2D ID Controller, always set the Tag memory setting to CA1D Mode. It is possible to read and write the Heat-resistant Tags (V680-D1KP58HTN and V680-D1K58HT) that are written by the V680-CA1D/-CA2D in CA1D Mode.

Use *_*TagMemTyp* (Tag Memory Type Setting) to set the ID Tag Memory. For details on setting items, refer to *3-2 Initial Settings Data*.

Additional Information

A label on the side of the ID Sensor Unit shows the version for Units with version 1.2 or later.

• CJ1W-V680C1□



Precautions for Correct Use

The Tag memory setting is a dedicated function of CJ-V680C1□. A different memory map will be used in the following cases: If a Reader/Writer manufactured by a company other than OMRON reads or writes the Heat-resistant Tags that were written by the V680-CA1D/-CA2D. Refer to *Operation When Tag Memory Setting Is Set to Standard Mode* in this section.
Refer to *Operation When Tag Memory Setting Is Set to Standard Mode* on page 1-7 in this section.

1-2 Using Heat-resistive Tags

This section provides information for using Heat-resistive Tags (V680-D1KP58HTN or V680-D1KP58HT).

If you are not using a Heat-resistive Tag, set the Tag memory setting to Standard Mode.

Use *_*TagMemTyp* (Tag Memory Type Setting) to set the ID Tag Memory. For details on setting items, refer to *3-2 Initial Settings Data*.

1-2-1 Precautions for Saving Data at High Temperatures

If you are using Heat-resistive Tags (V680-D1KP58HTN or V680-D1KP58HT), write the data again after saving data at a high temperature even if it is not necessary to change the data. A "high temperature" here means a temperature between 110°C and 200°C.

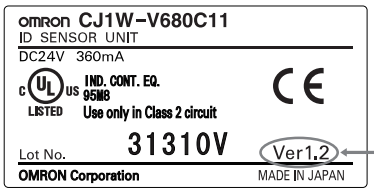
1-2-2 Using a Controller for a Heat-resistant RFID System (V680-CA1D/-CA2D)

If you are using Heat-resistive Tags (V680-D1KP58HTN or V680-D1KP58HT) and also using a V680-CA1D/-CA2D ID Controller, set the Tag memory setting of the ID Sensor Unit (version 1.2 or later) to CA1D Mode.

Additional Information

A label on the side of the ID Sensor Unit shows the version for Units with version 1.2 or later.

• CJ1W-V680C1□



If you are not using the V680-CA1D/-CA2D, the Tag memory setting is unnecessary.

Combining the V680-CA1D/-CA2D with Other V680-series Models

When using other models of the V680-series together with the V680-CA1D/-CA2D, make sure that the version allows Tag memory setting to CA1D Mode.

Precautions for Correct Use

To use CJ1W-V680C1□, it must be version 1.2 or later.

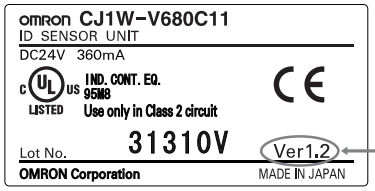
To use V680-CD5D01-V2, it must be version 2.3 or later.

To use V680-CH□D, it must be version 1.1 or later.

Additional Information

A label on the side of the ID Sensor Unit shows the version for Units with version 1.2 or later.

• CJ1W-V680C1□



1-2-3 Precautions when Setting the Tag Memory Setting to CA1D Mode

Applicable ID Tags

Only the V680-D1KP□□ ID Tags can be used when the Tag memory setting is set to CA1D Mode.

V680-D□KF□□ ID Tags cannot be used.

● **ID Tags That Can Be Used**

Model
V680-D1KP58HT
V680-D1KP58HTN
V680-D1KP52MT
V680-D1KP53M
V680-D1KP66T
V680-D1KP66MT

● **ID Tags That Cannot Be Used**

Model
V680-D2KF52M
V680-D2KF67
V680-D2KF67M
V680-D8KF67
V680-D8KF67M
V680-D8KF68
V680-D32KF68

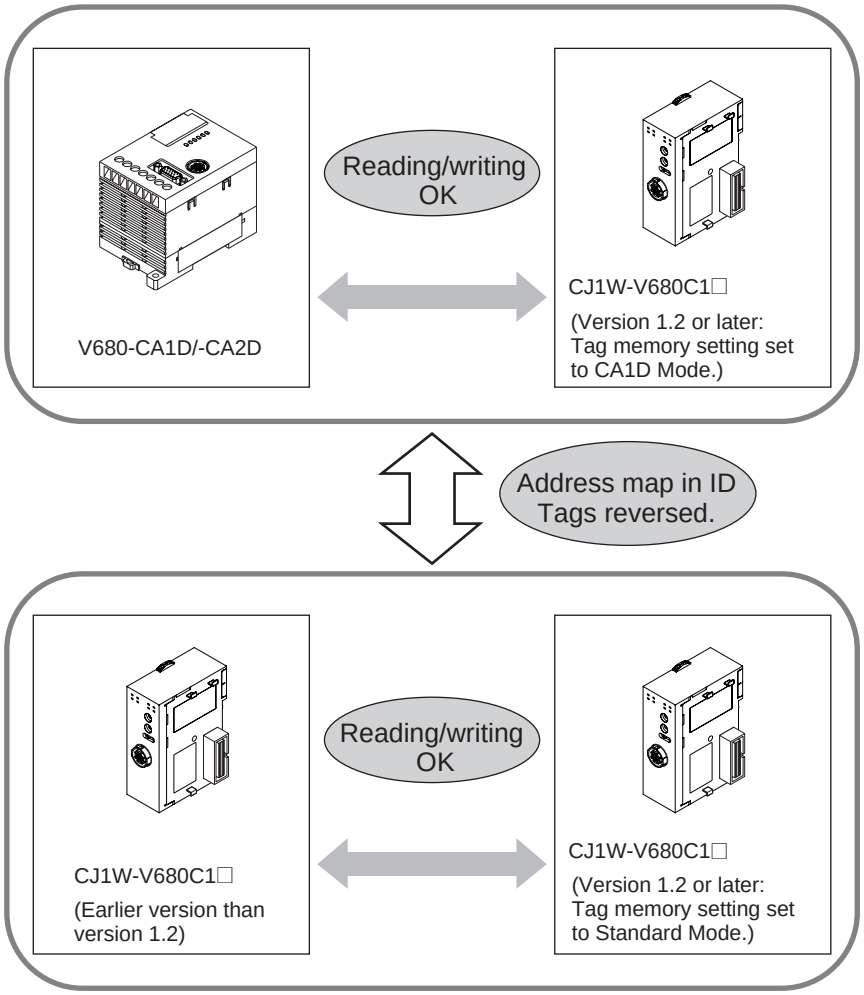
Write Protection in CA1D Mode Tag Memory Setting

When setting the Tag memory setting to CA1D Mode, always disable write protection setting.

Set **Ch#_WrProt*=1 (write protection disabled).

Combining ID Sensor Units and ID Controllers

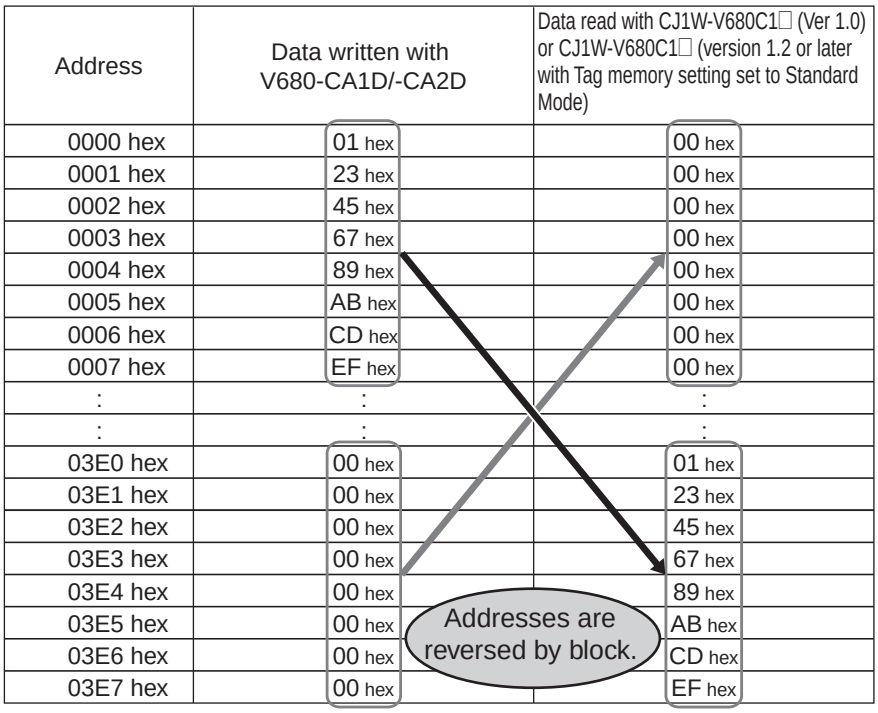
The address maps in the V680-D1KP□□ ID Tags (except for the V680-D1KP58HT) are reversed between the V680-CA1D/-CA2D ID Controller and CJ1W-V680C1□ ID Sensor Unit (unit version 1.2 or later and Tag memory setting set to CA1D Mode) and between CJ1W-V680C1□ (without version number) and CJ1W-V680C1□ (unit version 1.2 or later and Tag memory setting set to Standard mode). Therefore, be sure to set the Tag memory setting of this Unit to CA1D Mode to use the ID Tags which are used with V680-CA1D/-CA2D.


Reading/writing OK
V680-CA1D/-CA2D
CJ1W-V680C1□
(Version 1.2 or later: Tag memory setting set to CA1D Mode.)
Address map in ID Tags reversed.
Reading/writing OK
CJ1W-V680C1□
(Earlier version than version 1.2)
CJ1W-V680C1□
(Version 1.2 or later: Tag memory setting set to Standard Mode.)

Operation When Tag Memory Setting Is Set to Standard Mode

When data that was written to a V680-D1KP58HTN ID Tag with the V680-CA1D/-CA2D ID Controller is read from a CJ1W-V680C1□ ID Sensor Unit, the data is read from addresses that are reversed in one-block (eight-byte) units.

If you are going to use an ID Sensor Unit in the same line as a V680-CA1D/-CA2D ID Controller, use an ID Sensor Unit with version 1.2 or later and set the Tag memory setting to CA1D Mode.



Operation When Tag Memory Setting Is Set to CA1D Mode

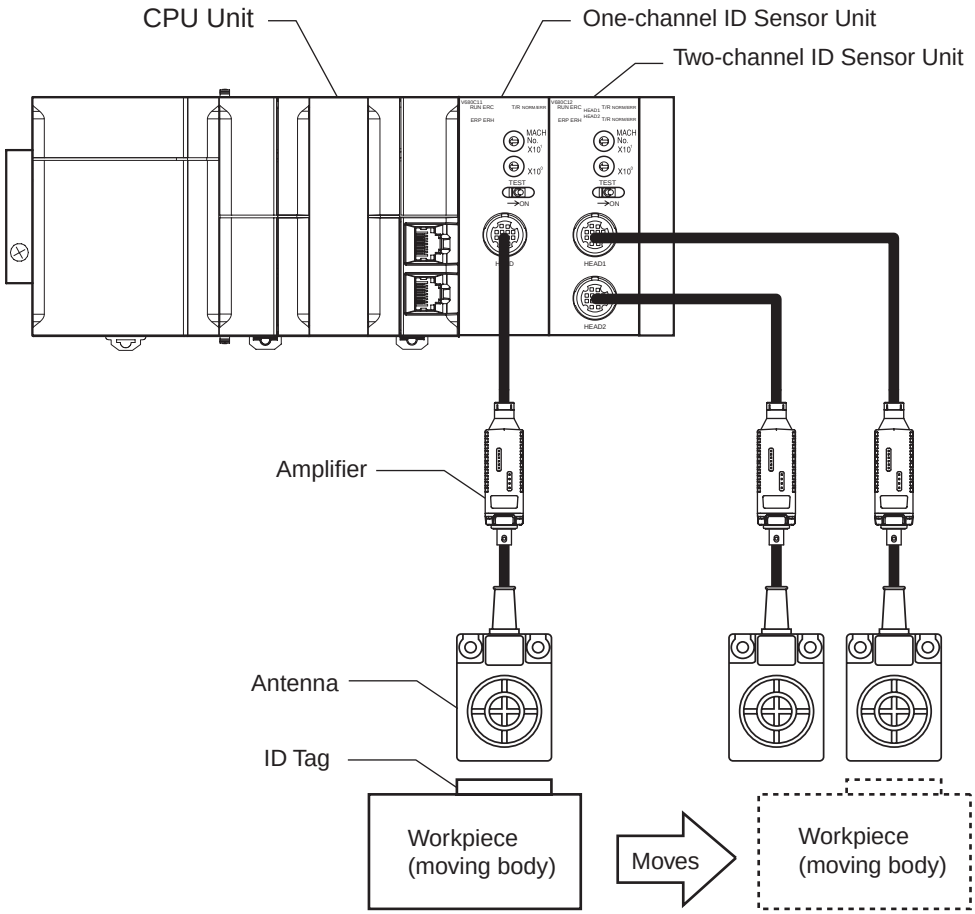
If the Tag memory setting for CJ1W-V680C1□ (version 1.2 or later) is set to CA1D Mode, data is read from or written to addresses that are reversed in block units for the V680-D1KP□□ (except for the V680-D1KP58HT) in the same way as for the V680-CA1D/-CA2D. Therefore, data can be read from the same addresses as those to which data was written by the V680-CA1D/-CA2D.

Address	Data written with V680-CA1D/-CA2D	Data read with CJ1W-V680C1□ (version 1.2 or later with Tag memory setting set to CA1D Mode)
0000 hex	01 hex	01 hex
0001 hex	23 hex	23 hex
0002 hex	45 hex	45 hex
0003 hex	67 hex	67 hex
0004 hex	89 hex	89 hex
0005 hex	AB hex	AB hex
0006 hex	CD hex	CD hex
0007 hex	EF hex	EF hex
:	:	:
:	:	:
03E0 hex	00 hex	00 hex
03E1 hex	00 hex	00 hex
03E2 hex	00 hex	00 hex
03E3 hex	00 hex	00 hex
03E4 hex	00 hex	00 hex
03E5 hex	00 hex	00 hex
03E6 hex	00 hex	00 hex
03E7 hex	00 hex	00 hex

Same as data read with V680-CA1D/-CA2D.

1-3 System Configuration

1-3-1 Basic System Configuration



Note The above example uses one One-channel ID Sensor Unit (CJ1W-V680C11) and one Two-channels ID Sensor Unit (CJ1W-V680C12).

Precautions for Correct Use

The V680-H01 Antenna and V680-H01-V2 Antenna can be connected to only the One-channel ID Sensor Unit (CJ1W-V680C11).
It cannot be connected to the Two-channels ID Sensor Unit (CJ1W-V680C12).

Additional Information

For details on Antennas, Amplifiers, and ID Tags, refer to the following manuals:
RFID System V680 Series User's Manual for Amplifiers, Antennas, and ID Tags (FRAM) (Cat. No. Z248), *V680 Series RFID System Amplifier/Tags (EEPROM) User's Manual* (Cat. No. Z262), and *Heat-resistive RFID System V680 Series User's Manual* (Cat. No. Z221).

1-3-2 Mounting Restrictions

These ID Sensor Units are classified as CJ-series Special I/O Units.

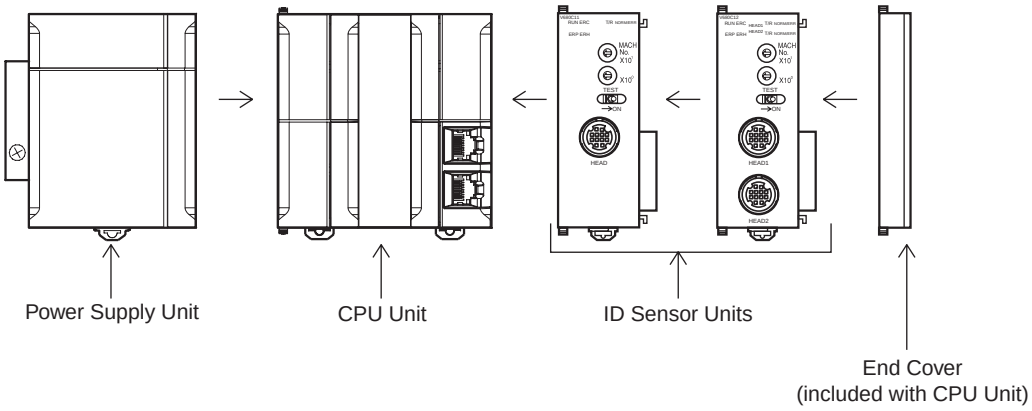
- These Units can be mounted to a NJ-series CPU Rack or Expansion Rack.
- The number of Units per CPU Rack or Expansion Rack depends on the current consumption of other Units on the Rack.

Precautions for Correct Use

The V680-H01 Antenna and V680-H01-V2 Antenna can be connected to only the One-channel ID Sensor Unit (CJ1W-V680C11).
It cannot be connected to the Two-channels ID Sensor Unit (CJ1W-V680C12).

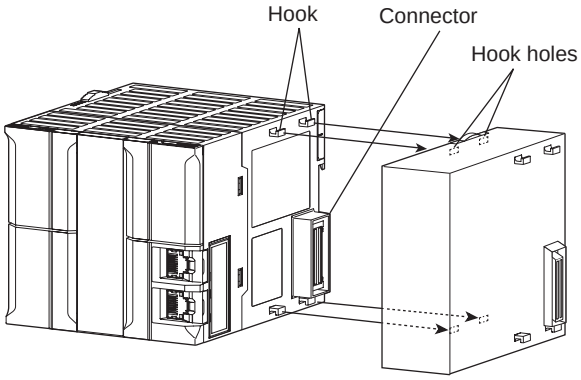
1-3-3 Mounting Units

Connect the ID Sensor Units as shown below.

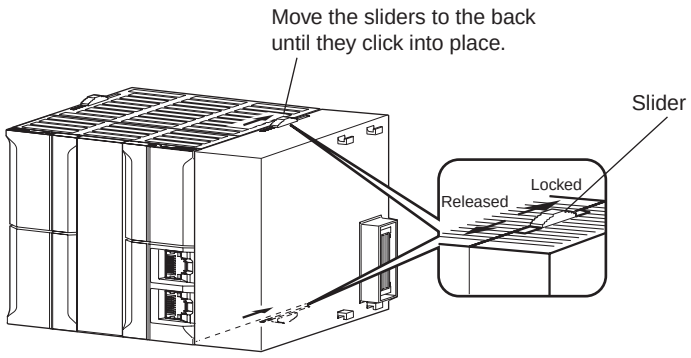


Use the following procedure to connect an ID Sensor Unit.

1 Align the connectors and press in firmly on the Units to connect them completely.



2 Move the yellow sliders on the top and bottom of the Unit to the lock position to secure the Units. The sliders should click into place.



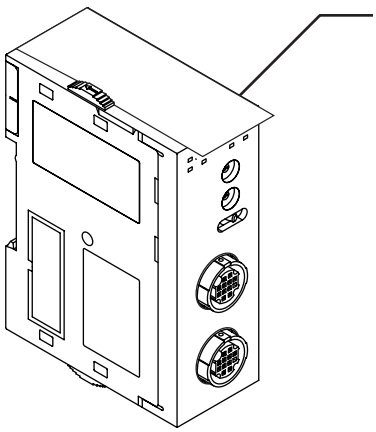
3 Attach an End Cover to the Unit on the right end of the Rack.

Precautions for Safe Use

The Unit may not operate properly if the sliders are not locked firmly into place.

1-3-4 Unit Handling Precautions

- Be sure to turn OFF the power supply before installing or disconnecting Units, or connecting lines.
- To reduce the influence of electrical noise, wire input and output lines in separate ducts from high-voltage and power lines.
- Prevent wire clippings, cutting chips or other materials from getting inside the Unit. They could cause scorching, failure, and malfunction. Pay particular attention to this during installation and take measures such as covering with a cover.
- If the Unit was shipped from the factory with the dust protection label on top of the unit, be sure to remove that label before switching ON the power. The label prevents heat dissipation and could cause a malfunction.



1-4 Functions by Application

Application	Function	Reference
Performing communications tests with ID Tags before creating a user program	Test Mode	p. 4-2
Adjusting communications timing with ID Tags Examples: • Communicating with ID Tags stopped in front of the Antenna • Communicating with ID Tags passing by the Antenna	Communications Specifications	p. 4-11
Protecting ID Tag memory from being overwritten by incorrect data	Write Protection	p. 4-27
Managing ID Tag life	ID Tag Service Life Check (EEPROM type)	p. 4-36
Checking the suitability of ID Tag memory	ID Tag Memory Check	p. 4-40
Checking ID Tag memory and correcting one-bit errors.	ID Tag Memory Error Correction	p. 4-43

2

Specifications of ID Sensor Units

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2-1-2 Performance Specifications 2-2
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2-1 Specifications

2-1-1 General Specifications

General specifications conform to those of CJ-series Special I/O Units.

2-1-2 Performance Specifications

	CJ1W-V680C11		CJ1W-V680C12
Unit classification	Special I/O Unit		
Internal current consumption	V680-HA63□ Amplifier connected:	5 VDC, 260 mA	5 VDC, 320 mA max.
		24 VDC, 130 mA	24 VDC, 260 mA max.
	V680-H01 Antenna connected:	5 VDC, 260 mA	
		24 VDC, 280 mA	
	V680-H01-V2 Antenna connected:	5 VDC, 260 mA	
		24 VDC, 280 mA	
Dimensions	31 x 90 x 65 mm (W x H x D)		
Weight	120 g max.		130 g max.
Mounting location	NJ-series CPU Rack or NJ-series Expansion Rack		
Connectable Antennas	V680-series Amplifiers and Antennas*		
Applicable ID Tags	V680-series ID Tags (V680-D□□)		
Operating modes	Normal Mode		
	Test Mode	• Communications tests • Distance level measurements • Read speed level measurements • Write speed level measurements • Noise level measurements • Communications success rate measurements	
Methods for exchanging data with CPU Unit	Data exchange by using I/O ports Refer to *Section 3 Data Exchange with the CPU Unit*.		
Diagnostic functions	(1) CPU watchdog timer (2) Communications error detection with ID Tag (3) Antenna power supply error		

* The V680-H01 Antenna and V680-H01-V2 Antenna can be connected only to CJ1W-V680C11 ID Sensor Unit. They cannot be used with CJ1W-V680C12 ID Sensor Unit.

2-1-3 Communications Function Specifications

	CJ1W-V680C11	CJ1W-V680C12
Communications control	(1) ID Tag Communications Speed (Normal Mode or High-speed Mode) (2) Write Verification Processing (3) Auto Wait Time Setting (4) UID Addition Setting (5) Write Protection Setting (6) Antenna Connection Setting (One-channel ID Sensor Unit (CJ1W-V680C11)) (7) Results Monitor Setting	
Commands	Read Write Bit Set/Bit Clear Mask Bit Write Calculation Write Data Fill Data Check Number of Writes Control Read with Error Correction Write with Error Correction UID Read Noise Measurement	Read Write Bit Set/Bit Clear Mask Bit Write Calculation Write Data Fill Data Check Number of Writes Control Copy Read with Error Correction Write with Error Correction UID Read Noise Measurement
Communications specification	Single trigger Single auto Repeat auto FIFO trigger* FIFO repeat* Multi-access trigger* Multi-access repeat*	

* FIFO trigger, FIFO repeat, Multi-access trigger, and Multi-access repeat specification cannot be used for communicating with V680-D1KP□□ ID Tags.

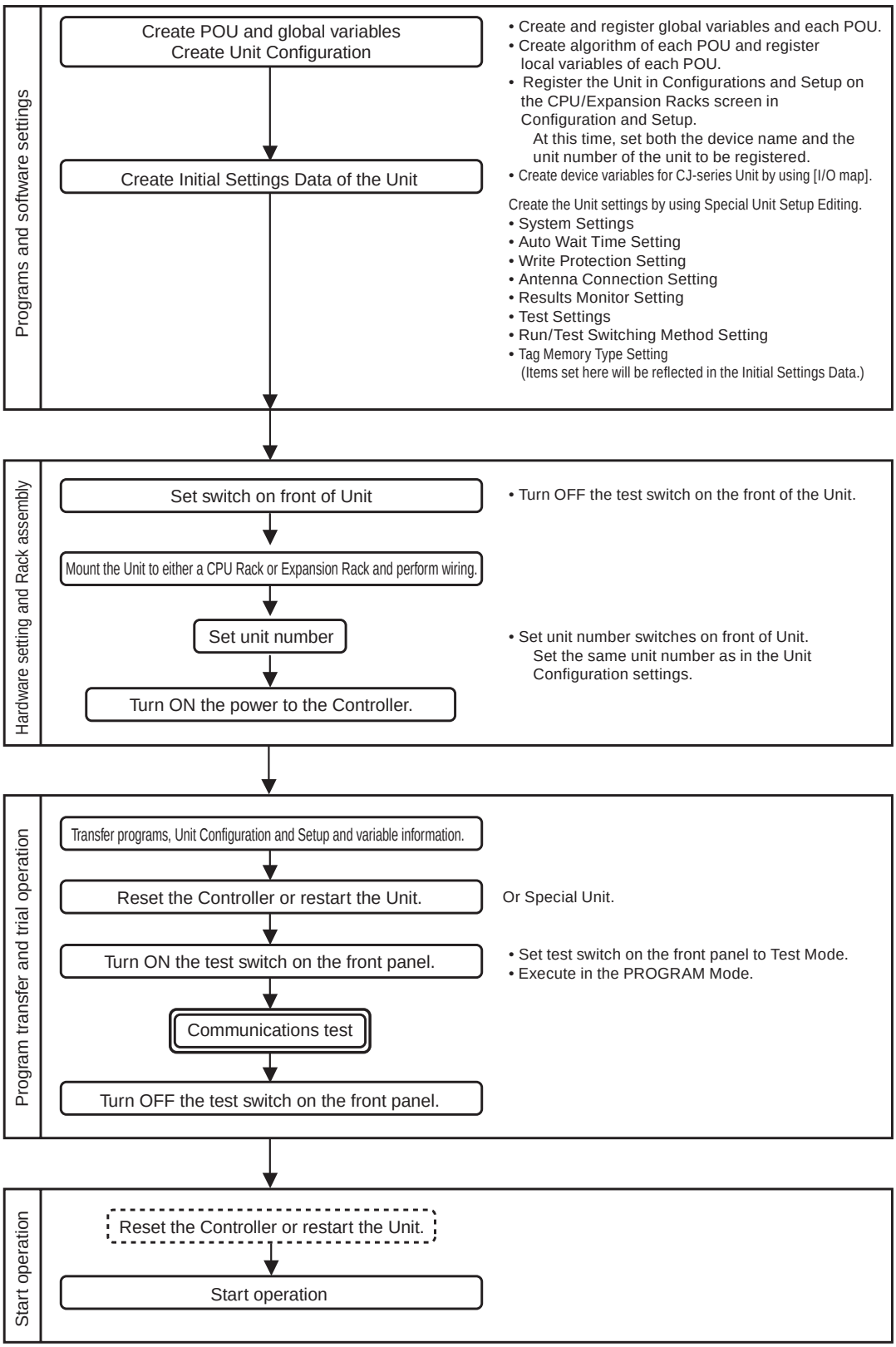
2-2 Operating Procedure

The operating procedure for an ID Sensor Unit is shown in the following flowchart.

The "Programs and software settings" and "Hardware setting and rack assembly" can be carried out in parallel or in the reverse order. There is no restriction in order.

Use Sysmac Studio to create and set programs.

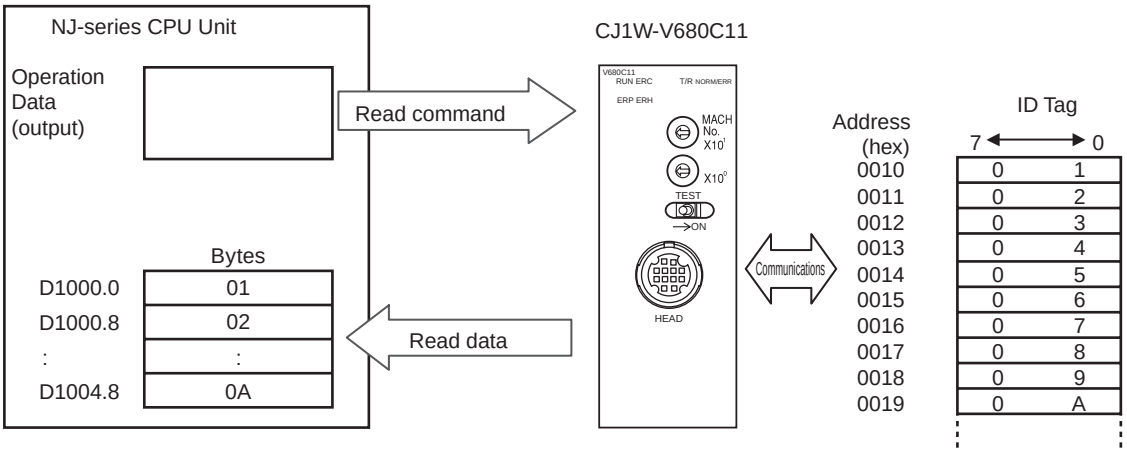
For details on operations of Sysmac Studio, refer to *Sysmac Studio Version 1 Operation Manual (Cat. No. W504).*


Programs and software settings
Create POU and global variables
Create Unit Configuration
Create Initial Settings Data of the Unit
• Create and register global variables and each POU.
• Create algorithm of each POU and register local variables of each POU.
• Register the Unit in Configurations and Setup on the CPU/Expansion Racks screen in Configuration and Setup.
At this time, set both the device name and the unit number of the unit to be registered.
• Create device variables for CJ-series Unit by using [I/O map].
Create the Unit settings by using Special Unit Setup Editing.
• System Settings
• Auto Wait Time Setting
• Write Protection Setting
• Antenna Connection Setting
• Results Monitor Setting
• Test Settings
• Run/Test Switching Method Setting
• Tag Memory Type Setting
(Items set here will be reflected in the Initial Settings Data.)
Hardware setting and Rack assembly
Set switch on front of Unit
• Turn OFF the test switch on the front of the Unit.
Mount the Unit to either a CPU Rack or Expansion Rack and perform wiring.
Set unit number
• Set unit number switches on front of Unit.
Set the same unit number as in the Unit Configuration settings.
Turn ON the power to the Controller.
Program transfer and trial operation
Transfer programs, Unit Configuration and Setup and variable information.
Reset the Controller or restart the Unit.
Or Special Unit.
Turn ON the test switch on the front panel.
• Set test switch on the front panel to Test Mode.
• Execute in the PROGRAM Mode.
Communications test
Turn OFF the test switch on the front panel.
Start operation
Reset the Controller or restart the Unit.
Start operation

2-2-1 Operating Procedure Example

The following is an operating procedure example for the following conditions.

Reading 10 bytes of data from ID tag address 16 (0010 hex) with the communications specification set to Trigger.



Settings for Special Unit

Unit number: 00

Command: Read

Communications specification: Trigger

Read data storage order: Rightmost → Leftmost

First ID Tag read address: 0010 hex

Number of ID Tag read bytes: 10 bytes

Read data storage destination: D1000.0 to D1004.15

In this example, the device name "RFID" is used when this Unit is registered in Unit Configuration.

Create Unit Configuration

Create a Unit Configuration in which the ID Sensor Controller Unit is registered.

You can create a Unit Configuration on the CPU/Expansion Racks screen in Configuration and Setup of Sysmac Studio. In this example, the device name for this Unit is set to "RFID" in the Unit Configuration.

Set Initial Settings Data

Set Initial Settings Data in Special Unit Setting of Sysmac Studio.

Additional Information

- For the settings of Initial Settings Data, refer to *4-3 Details of Initial Settings* on page 4-19 in *Section 4 ID Sensor Unit Functions*.
- When you use the Data Passing Mode Setting (added to Unit Ver. 1.2 and newer), use it in Cyclic Mode. When it is used with the NJ series, you cannot use Intelligent I/O Mode.
  For functions that you cannot use with NJ series, refer to *A-3 Functional Differences due to CPU Units (NJ/CJ-series) to be Connected*.

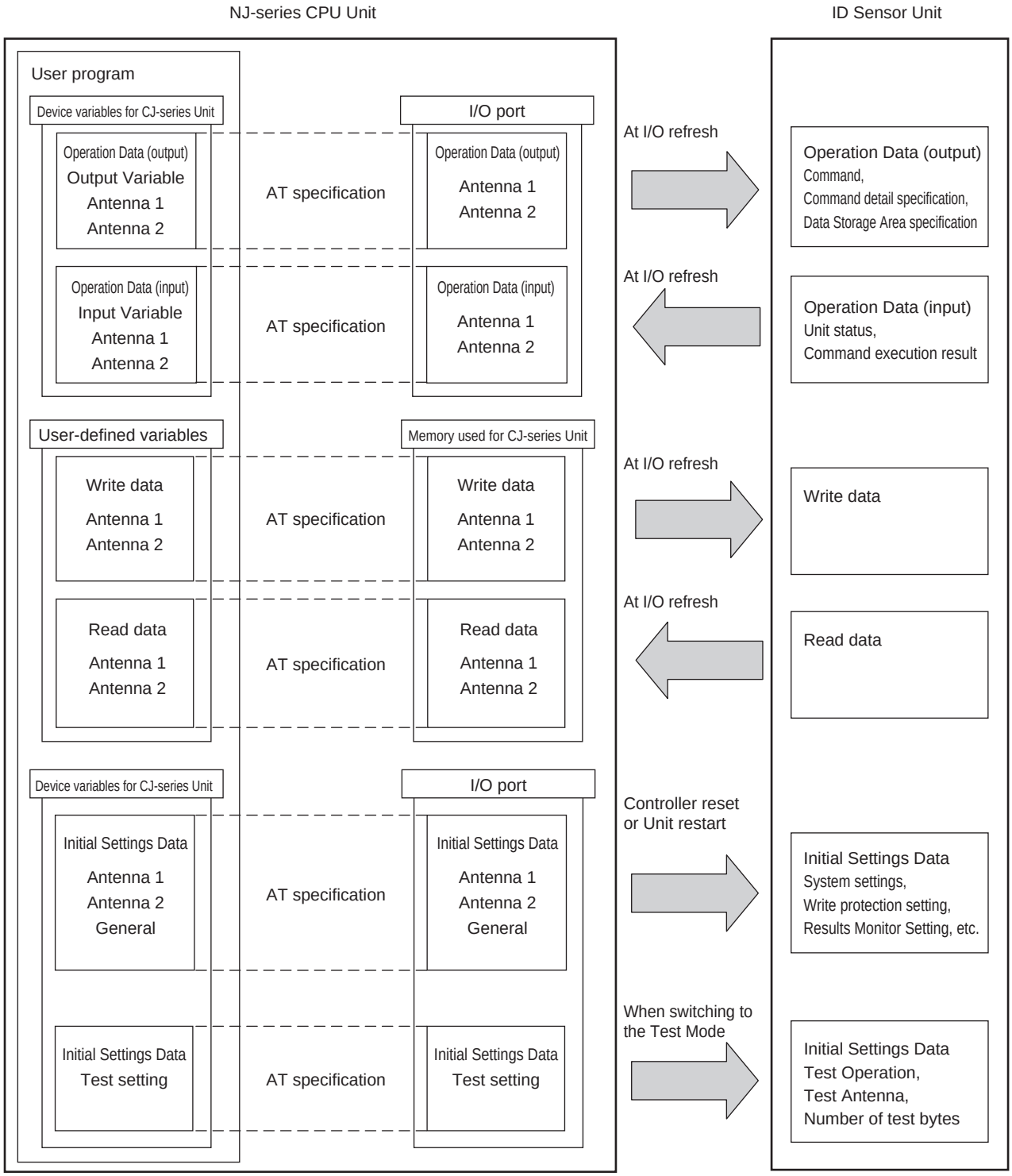
Creating User Programs

1 Create variables.

Create device variables for CJ-series Unit in [I/O Map] window from Sysmac Studio after Unit Configuration is created. In this example, variables created with the device variable creation function are used.

Register user-defined variables from Sysmac Studio before a user program is created.

(User-defined variables are used as storage destinations for data read from ID Tags and written to ID Tags.)



Note The CJ1W-V680C11 has no Antenna 2, so there are no I/O variables and Initial Settings Data for Antenna 2.

2 Create a user program.

Set commands, communications specifications, read data storage order, ID Tag read start address, number of bytes to read, and read data storage destination in the corresponding output variable among the device variables for CJ-series Unit of this ID Sensor Unit.

● Initial Settings Data

Name	Setup data device variable	Data type	Set value: Settings	
System Settings (Antenna 1)	RFID_Ch1_SysSet	WORD	16#0000	UID Addition: Disabled, Test Switch: Enabled, Write Verification: Verification, Communications Speed: Normal
UID Addition	Bits 15 to 12	---	16#0	Disabled
Test switch	Bits 11 to 08	---	16#0	Enabled
Write Verification	Bits 07 to 04	---	16#0	Verification
Communications Speed	Bits 03 to 00	---	16#0	Normal
Auto Wait Time Setting (Antenna 1)	RFID_Ch1_AutoWaitTm	WORD	16#0000	0.0 s (No timeout)
Write Protection Setting (Antenna 1)	RFID_Ch1_WrProt	USINT	0	V680 method
Antenna Connection Setting (Antenna 1)	RFID_Ch1_AntConn	USINT	0	Standard Antenna
Results Monitor Setting (Antenna 1)	RFID_Ch1_ProcRsltMonCfg	USINT	0	Communications Time Display
Run/Test Switching Method Setting	RFID_MethChgRunTest	WORD	16#0000	Test switch
Tag Memory Type Setting	RFID_TagMemTyp	USINT	0	Normal Mode
Test Operation	RFID_TestExec	BYTE	16#00	Communications test
Test Antenna	RFID_AntForTest	USINT	1	Antenna 1
Number of Test Bytes	RFID_ByteForTest	UINT	0	0 byte

● Defined Variables

Command Setting

Name	Data type	Factory setting	Allocated address (AT)	Comments	Settings in program
RFID_Ch1_CmdSet	WORD	16#0000	IOBus://rack#0/slot#0/Ch1_CmdSet	Command Setting (Antenna 1)	16#0000 (Read, trigger, data storage order: Rightmost → Leftmost)
RFID_Ch1_ProcAdr	UINT	0	IOBus://rack#0/slot#0/Ch1_ProcAdr	Processing Address (Antenna 1)	16 (Address 16)
RFID_Ch1_ProcByte	UINT	0	IOBus://rack#0/slot#0/Ch1_ProcByte	Number of Processing Bytes (Antenna 1)	10 (10 bytes)
RFID_Ch1_DatStorageSet	DWORD	16#0000 0000	IOBus://rack#0/slot#0/Ch1_DatStorageSet	Data Storage Area Setting (Antenna 1)	16#00001000 (Data storage area type and address D01000)
RFID_Ch1_CmdOption	UINT	0	IOBus://rack#0/slot#0/Ch1_CmdOption	Command Option (Antenna 1)	0 (No option specification)

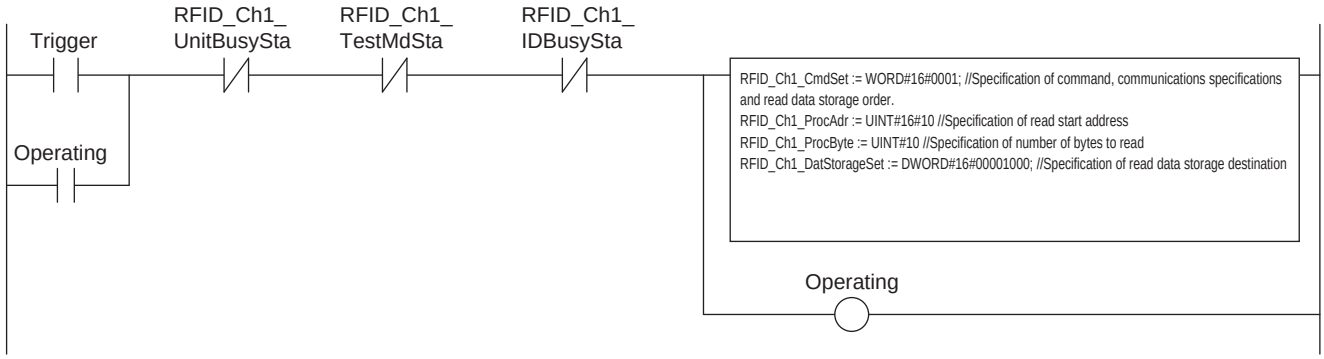
Instruction and status

Name	Data type	Factory setting	Allocated address (AT)	Comments
RFID_Ch1_ExecCmd	BOOL	False	IOBus://rack#0/slot#0/ Ch1_ExecCmd	Command Execution Bit (Antenna 1)
RFID_Ch1_IDBusySta	BOOL	False	IOBus://rack#0/slot#0/ Ch1_IDBusySta	ID Busy (Antenna 1)
RFID_Ch1_NormEndSta	BOOL	False	IOBus://rack#0/slot#0/ Ch1_NormEndSta	Command Normal End (Antenna 1)
RFID_Ch1_ErrEndSta	BOOL	False	IOBus://rack#0/slot#0/ Ch1_ErrEndSta	Command Error End (Antenna 1)
RFID_Ch1_TestMdSta	BOOL	False	IOBus://rack#0/slot#0/ Ch1_TestMdSta	Test Mode (Antenna 1)
RFID_Ch1_UnitBusySta	BOOL	False	IOBus://rack#0/slot#0/ Ch1_UnitBusySta	Unit Busy (Antenna 1)

● User-defined Variables

Name	Data type	Factory setting	Allocated address (AT)	Comments
Trigger	BOOL	False	---	Execution Input
Operating	BOOL	False	---	Command Execution Start
NormalEnd	BOOL	False	---	Normal End
ErrorEnd	BOOL	False	---	Error End
ReadData	ARRAY[0..17] OF BYTE	[18(16#0)]	%D1000*	Read data

* When HR, DM, or EM is specified as an allocated address (AT) for user-defined variables, set the Retain Attribute to Retained. When CIO/WR is specified, set it to Unretained.



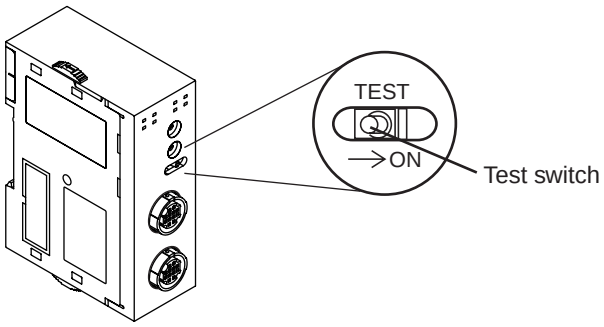
Command Execution Bit

Normal End

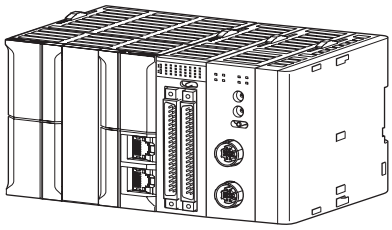
Error End

Hardware Setting of ID Sensor Units

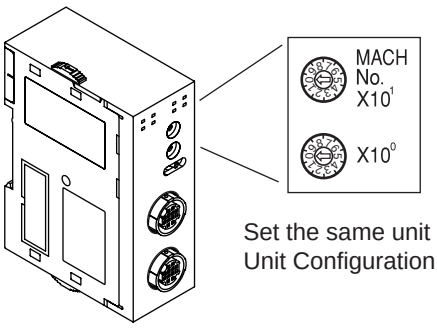
1 Test Switch Setting (on Unit's front panel.)



2 Mounting Units

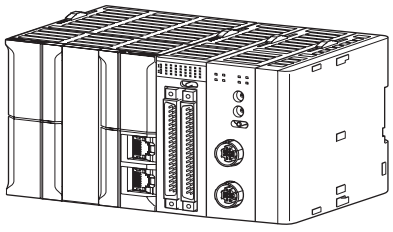


3 Unit Number Setting



Set the same unit number as in the Unit Configuration settings.

4 Turn ON the power supply to the Controller.



Additional Information

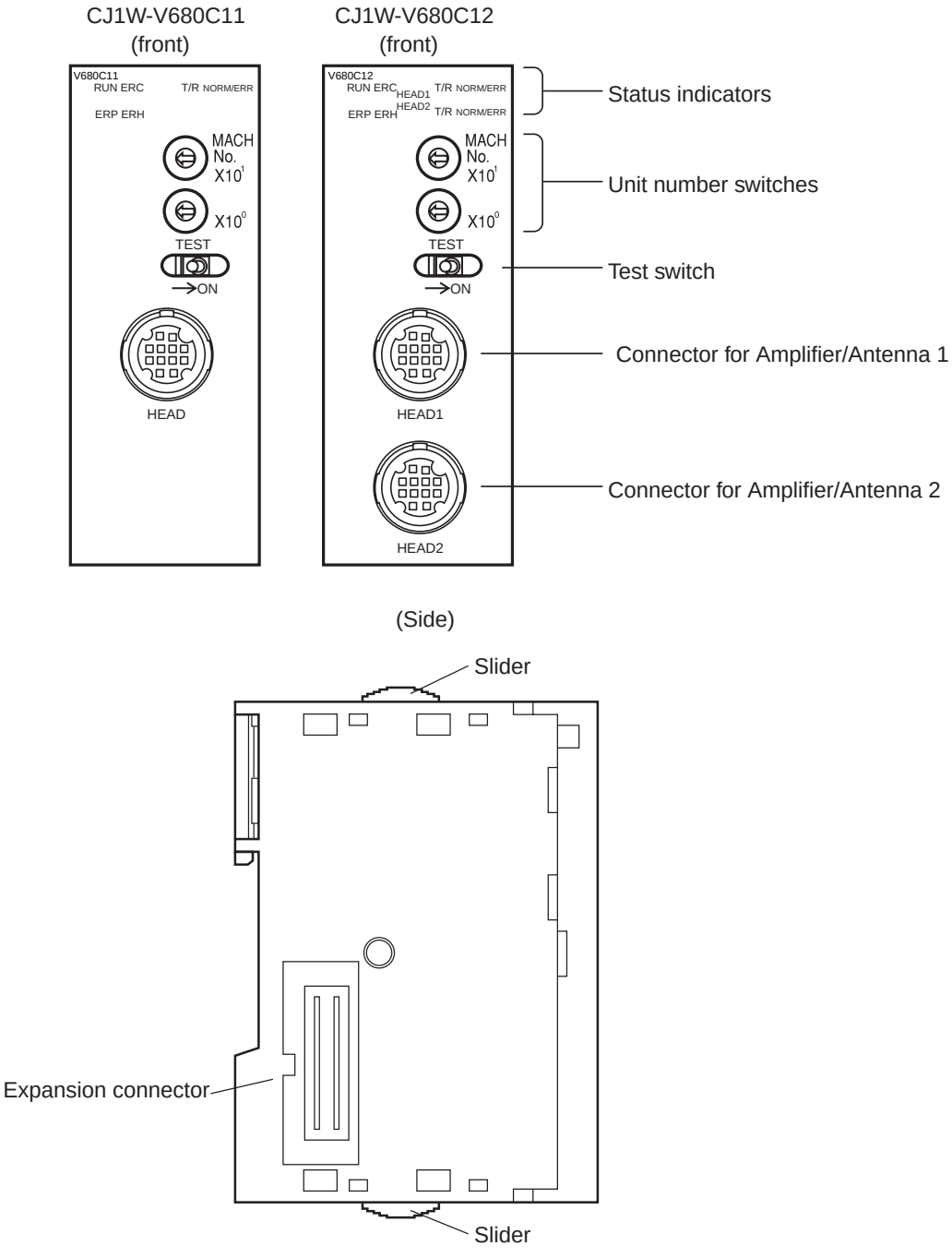
An I/O Setting Check Error occurs when there is a Unit Configuration in the CPU Unit which does not match the actual Unit Configuration. In this case, reset the controller in step 2 of the following *Transferring User Program to CPU Unit* to cancel the error.

Transferring User Program to CPU Unit

1. Connect Sysmac Studio to the Controller and transfer the created user program.
2. Reset the Controller. (Or restart this Unit.)
3. Run with the created user program.

2-3 Part Names and Functions

2-3-1 Part Names



2-3-2 Indicators

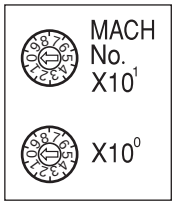
The indicators show the operating status of the Unit. The relationship between the indicator status and the Unit status is shown in the following table.

Indicator		Name	Color	Meaning	
RUN		RUN	Green	❍ Lit	The ID Sensor Unit is operating normally.
				● Not lit	The ID Sensor Unit is stopped.
ERC		Unit error	Red	❍ Lit	An error occurred in the ID Sensor Unit.
				● Not lit	No error occurred in the ID Sensor Unit.
ERH		CPU Unit error	Red	❍ Lit	An error occurred in the CPU Unit.
				● Not lit	No error occurred in the CPU Unit.
ERP		Antenna power error	Red	❍ Lit	An error occurred in the power supply to the Antenna.
				● Not lit	The power supply to the Antenna is normal.
Antenna 1 (HEAD1)	T/R	Communicating	Yellow	❍ Lit	Communications are active.
				● Not lit	Communications not performed with the ID Tag.
	NORM/ERR	Normal end	Green	❍ Lit	Communications with the ID Tag ended normally.
				● Not lit	The indicator does not light in all other cases.
		Error end	Red	❍ Lit	Communications with the ID Tag ended in an error.
				● Not lit	The indicator does not light in all other cases.
Antenna 2 (HEAD2)	T/R	Communicating	Yellow	❍ Lit	Communications are active.
				● Not lit	Communications not performed with the ID Tag.
	NORM/ERR	Normal end	Green	❍ Lit	Communications with the ID Tag ended normally.
				● Not lit	The indicator is not lit in all other cases.
		Error end	Red	❍ Lit	Communications with the ID Tag ended in an error.
				● Not lit	The indicator does not light in all other cases.

2-3-3 Unit Number Switches

Use the unit number switches to set the specific unit number for each Special I/O Unit mounted in a CPU Rack or Expansion Rack. The unit number must be the one registered in Unit Configurations.

Turn OFF the Controller before changing the unit number setting.



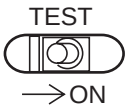
The CJ1W-V680C11 occupies one unit number and the CJ1W-V680C12 uses two unit numbers. Accordingly, set the number from 0 to 94 for CJ1W-V680C12.

Additional Information

- If two or more Special I/O Units are assigned the same unit number, a "Duplicate Unit Number" major fault level Controller error occurs and the Unit will not operate.
- After changing the unit number setting, turn the Controller power supply OFF and ON.

2-3-4 Test Switch

The test switch on the front panel is used to switch between Normal Mode (RUN) and Test Mode (TEST). Use *_*MethChgRunTest* (Run/Test Switching Method Setting) to select *Test switch*.



Status	Description
OFF	Normal Mode (RUN) (factory setting)
ON	Test Mode (TEST)

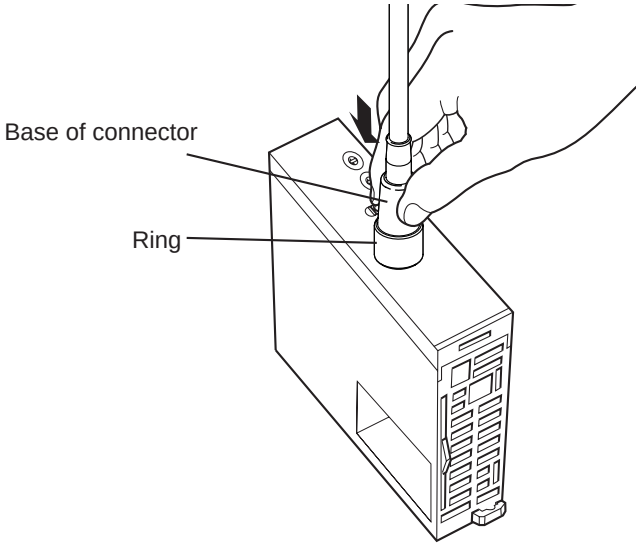
2-4 Connections and Wiring

2-4-1 Connecting the Antenna

Connection Method

1 Holding the base of the connector, align the white mark on the Unit with the white mark on the connector and insert the connector.

2 Press in on the connector until it locks in place.

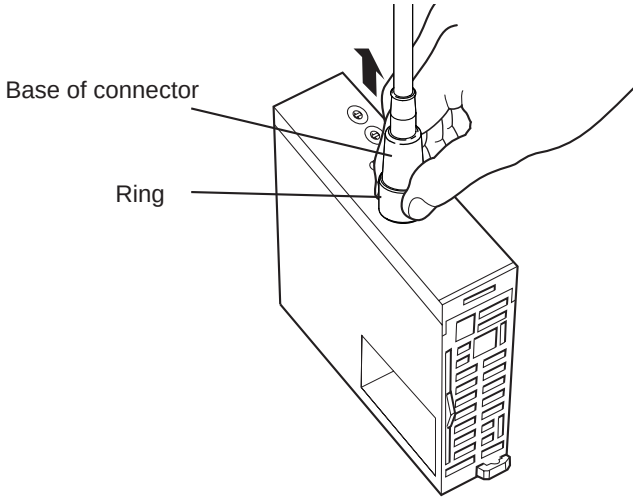


Additional Information

The connector will not lock into place if you hold onto the ring. Always hold onto the base of the connector.

Removal Method

1 Hold onto the ring and pull straight out.



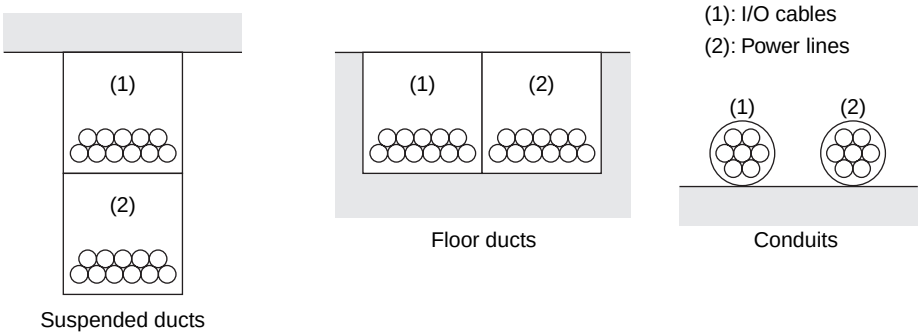
Precautions for Safe Use

- The connector cannot be removed if you hold onto the base of the connector. Never pull on the cable with excessive force. The connectors may be broken or damaged.
- Connecting or disconnecting the connector with power to the Unit turned ON may cause the Unit to be damaged or malfunction.

2-4-2 Wiring for Safety and Noise Immunity

Antenna Cable and I/O Signal Lines

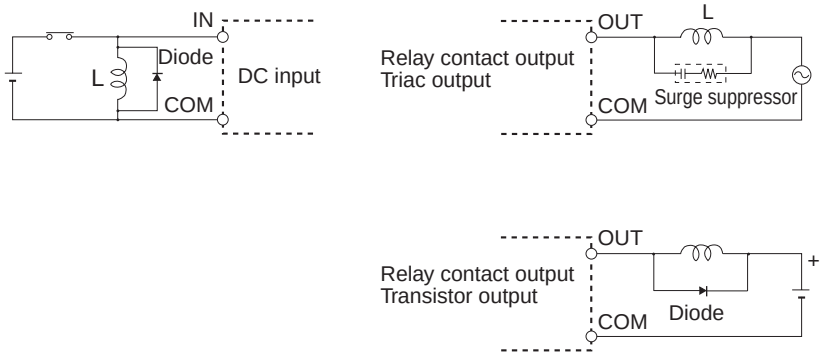
Wire the Antenna cable and I/O signal lines in separate ducts from power circuit cables both inside and outside the control panel.



If the same ducts must be used, use the shielded cables to increase resistance to noise. Connect one end of the shield to the ground terminal when you use the shielded cables.

● Countermeasures for Inductive Loads

If I/O is connected to an inductive load, connect a surge suppressor or diode in parallel with the load.



Use surge suppressors and diodes that meet the following conditions:

Surge Suppressors

Resistance: 50 Ω
Capacitance: 0.47 μF
Voltage: 200 V

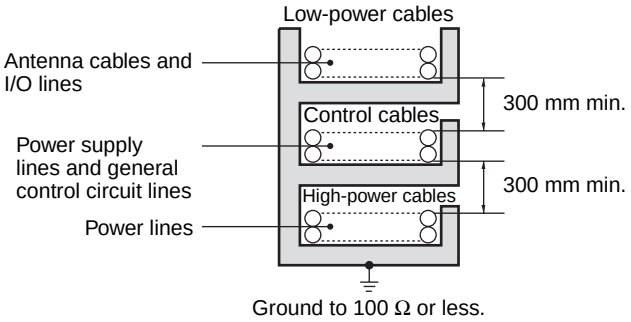
Diodes

Inrush withstand voltage: 3 times load voltage min.
Average rectified current: 1 A

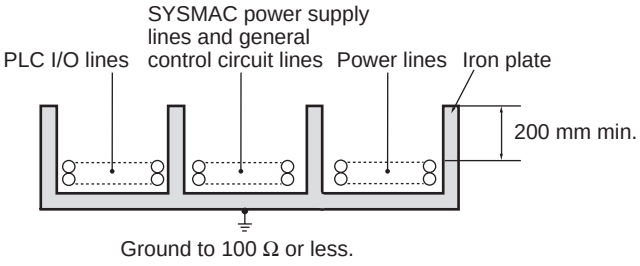
● Noise Countermeasures for External Wiring

Consider the following items when wiring external lines, such as the Antenna cable, I/O lines, power supply lines, and high-power lines.

- When using multiconductor cables for signal lines, do not use the same cable for both I/O lines and other control lines.
- When Racks are installed in parallel with each other, keep them separated by at least 300 mm.



- When placing cables in the same duct, separate them with grounded iron plates.



3

Data Exchange with the CPU Unit

3-1 Outline of Data Exchange 3-2
3-1-1 Unit Number Setting 3-4
3-1-2 Restarting Units 3-4
3-1-3 How to Access from User Program 3-5
3-2 Initial Settings Data 3-8
3-3 Operation Data 3-11

3-1 Outline of Data Exchange

Data is exchanged between the NJ-series CPU Unit and the CJ1W-V680C11/C12 ID Sensor Unit through the I/O ports created for the ID Sensor Unit and the memory for CJ-series Units.

The table and figure below show the data exchange method for each data type.

Data exchange type

Unit data type	Data contents	AT specification destination	How to access from user program	Timing of data exchange
Operation Data (output) Operation Data (input)	Unit status, command, command detailed specification, execution results, etc.	I/O port (Operation Data)	Device variables for CJ-series Unit (output variables and input variables)	At I/O refresh
Initial Settings Data	System settings, Write protection setting, Results Monitor Setting, etc.	I/O port (Initial Settings Data) (*)	Device variable for CJ-series Unit	When the Controller is reset or the Unit is restarted
Test Settings Data	Test Operation, Test Antenna, Number of test bytes			When switching to the Test Mode
Write data Read data	Command write data and read data	Memory used for CJ-series Unit	User-defined variable	At I/O refresh after instruction execution
Unit Restart Bit, etc.	Unit Restart Bit	None	System-defined variable	At I/O refresh

* The Initial Settings Data is retained in the CPU unit by the battery even during power interruptions. Whether or not command data is retained even during power interruptions depends on the area specification of the command storage area specification.

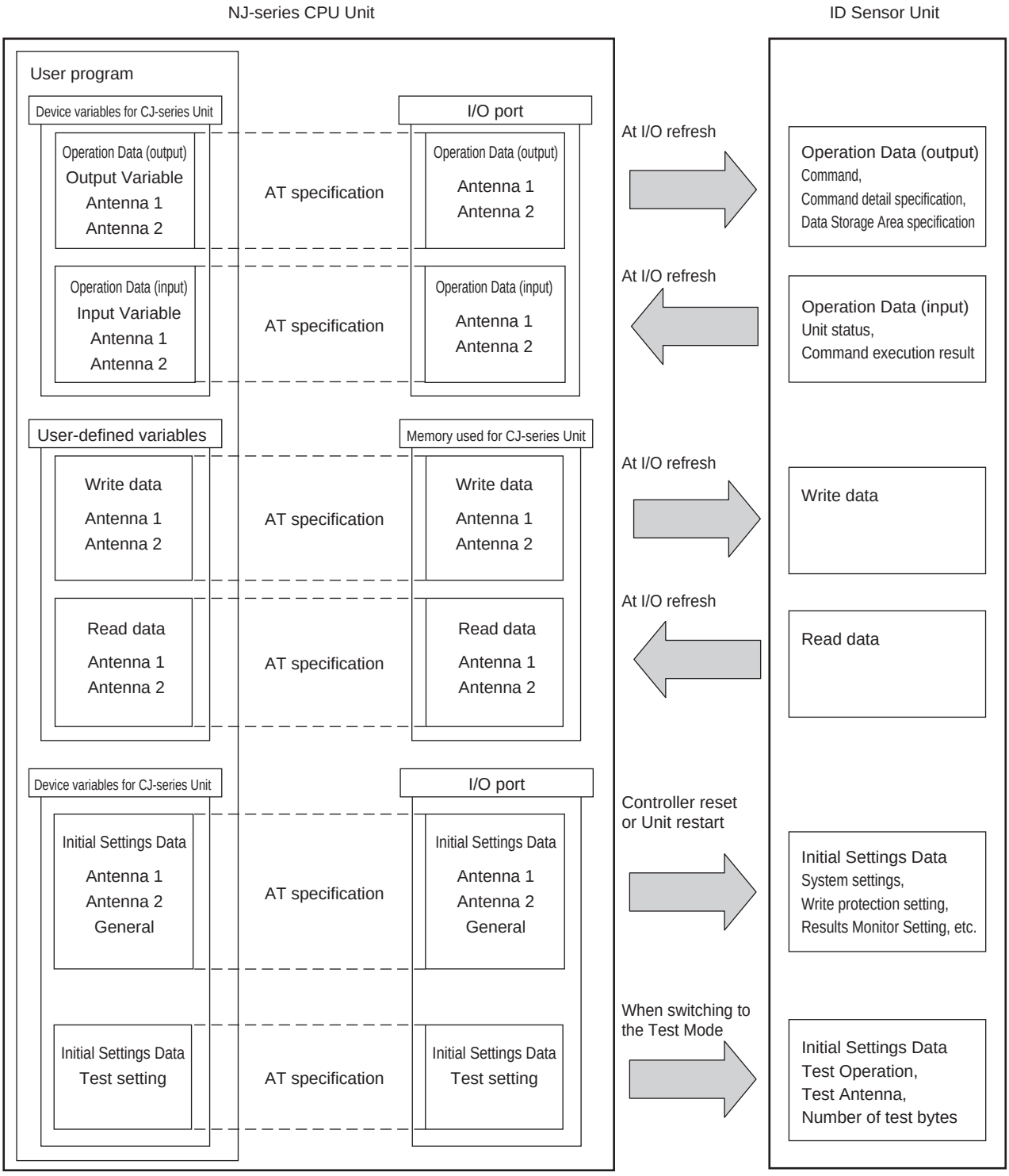
- Device Variables for CJ-series Unit

Use these variables to exchange data between the user program and ID Sensor Unit. Use device variables for CJ-series Units with AT specification for the I/O port.

Device variables for CJ-series Unit include output variables, input variables and initial settings data.

Create a Unit Configuration of the ID Sensor Unit by using Sysmac Studio, and then create device variable for CJ-series Unit on the I/O Map View window.

You can use generated device variables for CJ-series Unit in the user program.

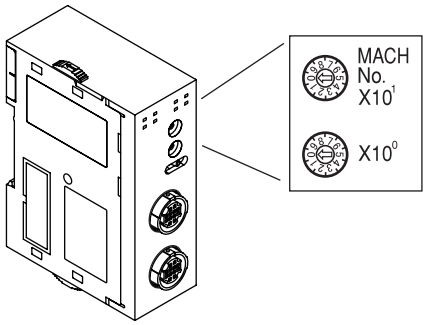


Note The CJ1W-V680C11 has no Antenna 2, so there are no I/O variables and Initial Settings Data for Antenna 2.

3-1-1 Unit Number Setting

Set the unit number by using the unit number switches on the Unit's front panel.

CJ1W-V680C11/C12



Precautions for Correct Use

- If two or more Special I/O Units are assigned the same unit number, a "Duplicate Unit Number" major fault level Controller error occurs and the Unit will not operate.
- After changing the unit number setting, turn the Controller power supply OFF and ON.
- When a Two-channel ID Sensor Unit (CJ1W-V680C12) is used, two unit numbers are allocated.

3-1-2 Restarting Units

Restart operation after you change the settings in the Initial Settings Data Area and transfer them to the CPU unit or after you remove the cause of an error.

The Initial Settings Data will be reflected after the Unit is restarted.

- Reset the Controller from Sysmac Studio.
- Restart from Sysmac Studio when initial settings parameters are transferred from Sysmac Studio.
- Turn the Controller power supply OFF and ON.
- Restart Unit operation from the program by issuing a ResetUnit instruction.
- Restart using the system-defined variable.
  *_CJB_SIO**Restart* ** corresponds to the unit number from 00 to 95.
  Change the system-defined variables corresponding to the unit number from 0 to 1.

Precautions for Correct Use

If the error persists after the restart, replace this Unit.

3-1-3 How to Access from User Program

The CPU Unit and ID Sensor Unit exchange information via the memory for CJ-series Units and I/O ports created for ID Sensor Units in the CPU Unit.

The user program exchanges various information by using the device variables for CJ-series Unit that specify the I/O ports for AT specification and user-defined variables that specify AT for the memory for CJ-series Unit.

Device Variables for CJ-series Unit

Device variables for CJ-series Units are used when Operation Data and Initial Settings Data are used.

Use device variables for CJ-series Units with AT specification for the I/O port, which is explained below.

● I/O port

An "I/O port" is a logical interface for data exchange between a CPU Unit and an ID Sensor Unit or other configuration unit.

An I/O port has a unique pre-defined name for each unit model and function.

An I/O port is automatically generated by creating the Unit Configuration with Sysmac Studio.

● How to specify device variables for CJ-series Units

After creating the Unit Configuration, use AT specification to allocate device variables for CJ-series Units to I/O ports from the I/O map of Sysmac Studio.

Specify the variable name with AT specification with the following method.

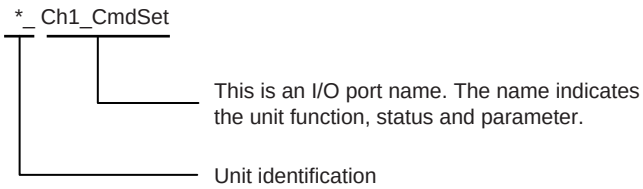
1 Select a variable already registered in the variable table

2 Input a new variable name

3 Automatically create a variable name with "Device variable creation"

When a device variable name for CJ-series Unit is assigned with the method in 2 or 3, the variables that were input from Sysmac Studio will be automatically registered in the variable table.

The following is the configuration of variable names created by automatic creation in method 3.



For *, the device name which is assigned when the Unit is registered in the Unit Configuration is set.(By default, a device name is assigned from "J01" in the order of registration in the Unit Configuration.) This identifies the Unit when a common device variable for CJ-series Unit is used.

In the explanations from here on, the device name automatically created is used as the device variable for CJ-series Unit, for example **_Ch1_CmdSet*.

For details on creation of device variables for CJ-series Unit, refer to *Sysmac Studio Version 1 Operation Manual (Cat. No. W504).*

User-defined Variables

Use user-defined variables as storage destinations for data read from ID Tags and written to ID Tags.

Create user-defined variables with AT specification in the memory used for CJ-series Unit. They can be used as storage areas/words of data read from ID Tags and written to ID Tags.

An example of assignment to user-defined variables is explained below.

User-defined variables are created as storage destination for data read from ID Tags.

The following storage destinations are set for data read by a given command:

- *_Ch1_DatStorageSet* = 16#00001000 (Data Storage Area type: DM, Bank specification: None, Storage word address: 001000)

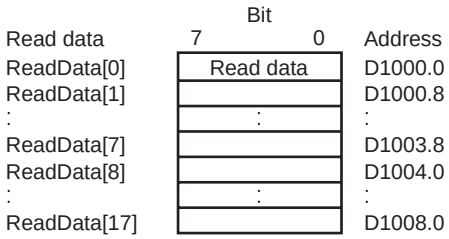
Word address	Data
D01000	Read data
D01001	:
:	:
D01009	Read data

Create the byte type array variable *ReadData* to store the above read data and set the AT specification for the specified storage area.

Assign this array variable to the area starting from D01000 using the Sysmac Studio.

Name	Data type	Factory setting	Allocated address (AT)	Comments
ReadData	ARRAY[0..17] OF BYTE	[18(16#0)]	%D1000	Read data

User-defined variables are defined as follows.



For details on creating user-defined variables, refer to *Sysmac Studio Version 1 Operation Manual (Cat. No. W504)*.

3-2 Initial Settings Data

Initial Data settings are set from Special Unit Setup Editing in Sysmac Studio.

The data setup is reflected in the initial setting data by transferring the program.

Antenna 1

Variable names	Type	R/W	Name	Function	Setting value
*_Ch1_SysSet	WORD	RW	System Settings (Antenna 1)	■ **Bits 15 to 12** Sets whether or not a UID will be added to the read command response.	0: Disabled 1: Enable
				■ **Bits 11 to 08** Enables or disables the Communications Test Mode switching by using the test switch on the front panel. You can disable the test switch to prevent accidentally entering Communications Test Mode.	0: Enabled 1: Disabled
				■ **Bits 07 to 04** Enables or disables verification for write operations. It is possible to disable verification to shorten the communications time. The verification setting is valid for all commands except for Read and Data Check with a processing specification of verification.	0: Verification 1: No verification
				■ **Bits 03 to 00** It is possible to increase the communications speed when the trigger, single auto and repeat auto functions are used.	0: Normal 1: High speed
*_Ch1_AutoWaitTm	WORD	RW	Auto Wait Time Setting (Antenna 1)	If a normal response is not received in communications with an ID Tag when the ID Tag is detected, retry processing will be performed to resend the same command. Retry processing is performed until the Auto Wait Time expires while the ID Sensor Unit waits for an ID Tag. The ID Tag wait status begins for a single auto specification, when command execution is started. From the second ID Tag for a repeat auto specification, it begins when communications with the previous ID Tag is complete. Specified with 4-digit BCD.	16#0000 to 16#9999 (x 0.1 s) 0: No timeout

Variable names	Type	R/W	Name	Function	Setting value
*_Ch1_WrProt	USINT	RW	Write Protection Setting (Antenna 1)	Enables or disables the write protection settings in ID Tags.	0: V680 method 1: Disabled 2: V600 method
*_Ch1_AntConn	USINT	RW	Antenna Connection Setting (Antenna 1)	The Antenna connection setting whether or not a V680-H01/H01-V2 Antenna is connected to the ID Sensor Unit.	0: Standard Antenna connected. 1: V680-H01/H01-V2 Antenna connected.
*_Ch1_ProcRsltMonCfg	USINT	RW	Results Monitor Setting (Antenna 1)	Set the information output to the "Processing Results Monitor (*_*Ch1_ProcRsltMon*)".	0: Communications time 1: Noise level

Antenna 2

Variable names	Type	R/W	Name	Function	Setting value
*_Ch2_SysSet	WORD	RW	System Settings (Antenna 2)	■ **Bits 15 to 12** Sets whether or not a UID will be added to the read command response.	0: Disabled 1: Enable
				■ **Bits 11 to 08** Enables or disables the Communications Test Mode switching by using the test switch on the front panel. You can disable the test switch to prevent accidentally entering Communications Test Mode.	0: Enabled 1: Disabled
				■ **Bits 07 to 04** Enables or disables verification for write operations. It is possible to disable verification to shorten the communications time. The verification setting is valid for all commands except for Read and Data Check with a processing specification of verification.	0: Verification 1: No verification
				■ **Bits 03 to 00** It is possible to increase the communications speed when the trigger, single auto and repeat auto functions are used.	0: Normal 1: High speed
*_Ch2_AutoWaitTm	WORD	RW	Auto Wait Time Setting (Antenna 2)	If a normal response is not received in communications with an ID Tag when the ID Tag is detected, retry processing will be performed to resend the same command. Retry processing is performed until the Auto Wait Time expires while the ID Sensor Unit waits for an ID Tag. The ID Tag wait status begins for a single auto specification, when command execution is started. From the second ID Tag for a repeat auto specification, it begins when communications with the previous ID Tag is complete. Specified with 4-digit BCD.	16#0000 to 16#9999 (x 0.1 s) 0: No timeout

Variable names	Type	R/W	Name	Function	Setting value
*_Ch2_WrProt	USINT	RW	Write Protection Setting (Antenna 2)	Enables or disables the write protection settings in ID Tags.	0: V680 method 1: Disabled 2: V600 method
*_Ch2_AntConn	USINT	RW	Antenna Connection Setting (Antenna 2)	Use with the factory setting.	0: Standard Antenna connected.
*_Ch2_ProcRsltMonCfg	USINT	RW	Results Monitor Setting (Antenna 2)	Set the information output to the "Processing Results Monitor (*_Ch2_ProcRsltMon)".	0: Communications time 1: Noise level

Note You can use Antenna 2 parameters only with CJ1W-V680C12.

Common

Variable names	Type	R/W	Name	Function	Setting value
*_AntForTest	USINT	RW	Test Antenna	Set the Antenna to execute the test.	1: Antenna 1 (HEAD 1) 2: Antenna 2 (HEAD 2)
*_TestExec	BYTE	RW	Test Operation	Set the Test Operation.	16#00: Communications test 16#A0: Distance level 16#B0: Read speed level 16#B1: Write speed level 16#C0: Noise level 16#C1: Communications success rate
*_ByteForTest	UINT	RW	Number of Test Bytes	Specify the number of test bytes.	0 to 2048 (bytes)
*_MethChgRunTest	WORD	RW	Run/Test Switching Method Setting	Select the switching method between Normal Mode (RUN) and Test Mode (TEST). Switch the mode by the test switch or RUN/TEST Bit (Antenna #) (*Ch#_RunTestChg*).	16#0000: Test switch 16#0001: CPU Unit
*_TagMemTyp	USINT	RW	Tag Memory Type Setting	Specify the ID Tag memory map mode when the V680-CA1D/-CA2D ID Controller for Heat-resistant RFID System is used together with the Unit.	0: Standard Mode 1: CA1D Mode

3-3 Operation Data

Output Variable

Antenna 1

Variable names	Type	R/W	Name	Function	Setting value
*_Ch1_ExecCmd	BOOL	RW	Command Execution Bit (Antenna 1)	When this bit is set to 1, the ID Sensor Unit will interpret the command and start execution.	0: - 1: Command execution
*_Ch1_ErrRst	BOOL	RW	Error Reset Bit (Antenna 1)	If this bit is set to 1 while the ID Sensor Unit waits for the Command Execution Bit to be turned ON, the Results Information of input variables will be cleared.	0: - 1: Error reset
*_Ch1_AbtCmd	BOOL	RW	Abort Bit (Antenna 1)	Execution is aborted if this bit is set to 1 during command execution. If communications are aborted for an FIFO trigger communications specification, prohibiting communications with ID Tags that complete communications with the antenna and stay inside the communications range will be cleared.	0: - 1: Abort
*_Ch1_RunTestChg	BOOL	RW	RUN/TEST Bit (Antenna 1)	Set to 0 for Normal Mode (RUN), or set to 1 for Test Mode (TEST). (Enabled only when *Run/Test Switching Method Setting (*_MethChgRunTest)* is set to *CPU Unit*.)	0: Normal Mode (RUN) 1: Test Mode (TEST)

Variable names	Type	R/W	Name	Function	Setting value
*_Ch1_CmdSet	WORD	RW	Command Setting (Antenna 1)	■ **Bits 15 to 08** Specify the command to be executed.	16#00: Read 16#01: Write 16#02: Bit Set 16#03: Bit Clear 16#04: Mask Bit Write 16#05: Calculation Write 16#06: Data Fill 16#07: Data Check 16#08: Number of Writes Control 16#09: Copy* 16#0A: Read with Error Correction 16#0B: Write with Error Correction 16#0C: UID Read 16#10: Noise Measurement
				■ **Bits 07 to 04** Specify the communications method with an ID Tag. (The communications methods that you can specify vary according to the command specified by bits 15 to 08.)	16#0: Trigger 16#1: Single auto 16#2: Repeat auto 16#3: FIFO trigger 16#4: FIFO repeat 16#5: Multi-access trigger 16#6: Multi-access repeat
				■ **Bits 03 to 00** Specify the processing details according to the commands specified by bits 15 to 08.	Refer to *Command and Option Settings* on *Page 3-16*.
*_Ch1_ProcAdr	UINT	RW	Processing Address (Antenna 1)	Specify the processing start address in the ID Tag. (The range that you can specify varies according to the command specified by bits 15 to 08 of *_*Ch1_CmdSet*.)	Refer to *Command and Option Settings* on *Page 3-16*.
*_Ch1_ProcByte	UINT	RW	Number of Processing Bytes (Antenna 1)	Specify the number of processing bytes in the ID Tag. (The range that you can specify varies according to the command specified by bits 15 to 08 of *_*Ch1_CmdSet*.)	Refer to *Command and Option Settings* on *Page 3-16*.

Variable names	Type	R/W	Name	Function	Setting value
*_Ch1_DatStorageSet	DWORD	RW	Data Storage Area Setting (Antenna 1)	■ **Bits 31 to 28** Specify the data storage area.	Refer to *Designating Data Storage Areas* on *Page 3-17*.
				■ **Bits 27 to 24** If the EM Area is specified, specify the bank number.	Refer to *Designating Data Storage Areas* on *Page 3-17*.
				■ **Bits 23 to 00** Specify the storage word address in 5-digit BCD.	Refer to *Designating Data Storage Areas* on *Page 3-17*.
*_Ch1_CmdOption	UINT	RW	Command Option (Antenna 1)	Specify the command option. (Whether or not command options are available, and details of command options, vary depending on the command specified by bits 15 to 08 of **_Ch1_CmdSet*.)	Refer to *Command and Option Settings* on *Page 3-16*.

* You can use the Copy Command only with CJ1W-V680C12.

Antenna 2

Variable names	Type	R/W	Name	Function	Setting value
*_Ch2_ExecCmd	BOOL	RW	Command Execution Bit (Antenna 2)	When this bit is set to 1, the ID Sensor Unit will interpret the command and start execution.	0: - 1: Command execution
*_Ch2_ErrRst	BOOL	RW	Error Reset Bit (Antenna 2)	If this bit is set to 1 while the ID Sensor Unit waits for the Command Execution Bit to be turned ON, the Results Information of input variables will be cleared.	0: - 1: Error reset
*_Ch2_AbtCmd	BOOL	RW	Abort Bit (Antenna 2)	Execution is aborted if this bit is set to 1 during command execution. If communications are aborted for an FIFO trigger communications specification, prohibiting communications with ID Tags that complete communications with the antenna and stay inside the communications range will be cleared.	0: - 1: Abort
*_Ch2_RunTestChg	BOOL	RW	RUN/TEST Bit (Antenna 2)	Set to 0 for Normal Mode (RUN), or set to 1 for Test Mode (TEST). (Enabled only when *Run/Test Switching Method Setting (*_MethChgRunTest)* is set to *CPU Unit*.)	0: Normal Mode (RUN) 1: Test Mode (TEST)
*_Ch2_CmdSet	WORD	RW	Command Setting (Antenna 2)	■ **Bits 15 to 08** Specify the command to be executed.	16#00: Read 16#01: Write 16#02: Bit Set 16#03: Bit Clear 16#04: Mask Bit Write 16#05: Calculation Write 16#06: Data Fill 16#07: Data Check 16#08: Number of Writes Control 16#09: Copy* 16#0A: Read with Error Correction 16#0B: Write with Error Correction 16#0C: UID Read 16#10: Noise Measurement
				■ **Bits 07 to 04** Specify the communications method with an ID Tag. (The communications methods that you can specify vary according to the command specified by bits 15 to 08.)	16#0: Trigger 16#1: Single auto 16#2: Repeat auto 16#3: FIFO trigger 16#4: FIFO repeat 16#5: Multi-access trigger 16#6: Multi-access repeat
				■ **Bits 03 to 00** Specify the processing details according to the commands specified by bits 15 to 08.	Refer to *Command and Option Settings* on *Page 3-16*.

Variable names	Type	R/W	Name	Function	Setting value
*_Ch2_ProcAdr	UINT	RW	Processing Address (Antenna 2)	Specify the processing start address in the ID Tag. (Specifiable ranges vary according to the command specified by bits 15 to 08 of *_*Ch2_CmdSet*.)	Refer to *Command and Option Settings* on *Page 3-16*.
*_Ch2_ProcByte	UINT	RW	Number of Processing Bytes (Antenna 2)	Specify the number of processing bytes in the ID Tag. (Specifiable ranges vary according to the command specified by bits 15 to 08 of *_*Ch2_CmdSet*.)	Refer to *Command and Option Settings* on *Page 3-16*.
*_Ch2_DatStorageSet	DWORD	RW	Data Storage Area Setting (Antenna 2)	■ **Bits 31 to 28** Specify the Data Storage Area.	Refer to *Designating Data Storage Areas* on *Page 3-17*.
				■ **Bits 27 to 24** If the EM Area is specified, specify the bank number.	Refer to *Designating Data Storage Areas* on *Page 3-17*.
				■ **Bits 23 to 00** Specify the storage word address in 5-digit BCD.	Refer to *Designating Data Storage Areas* on *Page 3-17*.
*_Ch2_CmdOption	UINT	RW	Command Option (Antenna 2)	Specify the command option. (Whether or not command options are available, and details of command options, vary depending on the command specified by bits 15 to 08 of *_*Ch2_CmdSet*.)	Refer to *Command and Option Settings* on *Page 3-16*.

Note You can use output variables for Antenna 2 only with CJ1W-V680C12.

* You can use the Copy Command only with CJ1W-V680C12.

● Command and Option Settings

Command Name	Classification	Command					Option	Data stored in Data Storage Area*5	Reference
	Output variable	*_Ch1_CmdSet *_Ch2_CmdSet			*_Ch1_ProcAdr *_Ch2_ProcAdr	*_Ch1_ProcByte *_Ch2_ProcByte	*_Ch1_CmdOption *_Ch2_CmdOption		
	Relay name	Command Code (hex)	Communications Specification (hex)*2	Processing Specification (hex)*3	Processing Addresses (hex)*4	Number of Bytes (hex)*4	Command Option*4		
Read	00	0: Trigger 1: Single auto 2: Repeat auto 3: FIFO trigger 4: FIFO repeat 5: Multi-access trigger 6: Multi-access repeat	Data storage order 0: Leftmost → Rightmost 1: Rightmost → Leftmost	0000 to FFFF	0001 to 0800	---	Read data	P. 5-8
Write	01				0000 to FFFF	0001 to 0800	---	Write data	P. 5-9
Bit Set	02				0000 to FFFF	0001 to 0004	---	Designation Data for Bit Set	P. 5-10
Bit Clear	03				0000 to FFFF	0001 to 0004	---	Designation Data for Bit Clear	P. 5-12
Mask Bit Write	04				0000 to FFFE	---	Designation Data for Mask 0000 to FFFE	Write data	P. 5-14
Calculation Write	05			0: Add 1: Subtract	0000 to FFFF	0001 to 0004	Operation value 0000 to FFFF	Calculation result	P. 5-16
Data Fill	06			0: Bytes 1: Words	0000 to FFFF	0000 (All) 0001 to 0800	Fill data 0000 to FFFF	---	P. 5-18
Data Check	07	0: Trigger 1: Single auto		0: Calculation 1: Verification	0000 to FFFD	0003 to 0800	---	---	P. 5-19
Number of Writes Control	08			0: Add 1: Subtract	0000 to FFFD	---	No. to add 0000 to 00FF	Result of number of writes calculation	P. 5-20
Copy*1	09			---	Read Addresses 0000 to FFFF	0001 to 0800	Write Addresses 0000 to FFFF	---	P. 5-21
Read with Error Correction	0A	0: Trigger 1: Single auto 2: Repeat auto 3: FIFO trigger 4: FIFO repeat 5: Multi-access trigger 6: Multi-access repeat	Data storage order 0: Leftmost → Rightmost 1: Rightmost → Leftmost		0000 to FFFA	0001 to 01FE	---	Read data	P. 5-22
Write with Error Correction	0B				0000 to FFFA	0001 to 01FE	---	Write data	P. 5-23
UID Read	0C				---	---	---	Read data	P. 5-24
Noise Measurement	10	---	---	---	---	---	---	Measurement results	P. 5-25

*1 You can use the Copy Command only with CJ1W-V680C12.

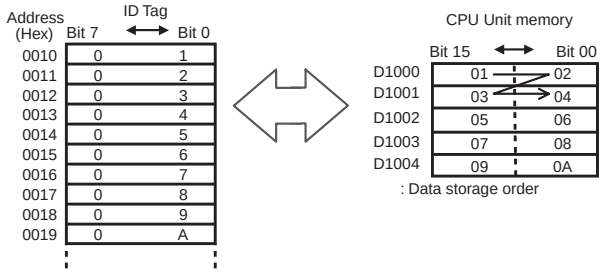
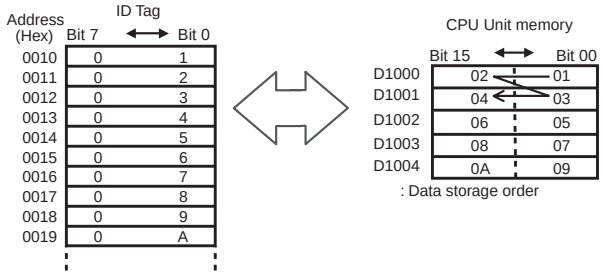
*2 Refer to *4-2 Communications Specifications* on page 4-11 in *Section 4 ID Sensor Unit Functions* for communications specifications.

*3 Refer to *Designating Processing Specifications* on page 3-17.

*4 The variable data type is UINT. Convert the variable data type to UINT for use in a user program.

*5 Refer to *Designating Data Storage Areas* on page 3-17 for designation methods.

● Designating Processing Specifications

Commands	Processing Specification
Read Write Bit Set Bit Clear Mask Bit Write Read with Error Correction Write with Error Correction UID Read	0: Leftmost to Rightmost  1: Rightmost to Leftmost 
Calculation Write Number of Writes Control	0: Add 1: Subtract
Data Fill	0: Bytes (Rightmost 8 bits) 1: Words
Data Check	0: Calculation (write) 1: Verification

● Designating Data Storage Areas

The Data Storage Area uses the memory used for CJ-series Unit. Before you create a program, create user-defined variables with Sysmac Studio and set the AT specification for the memory that is specified as the data storage area/words.

		Output variable	*_Ch1_DatStorageSet *_Ch2_DatStorageSet		
		Bits	31 to 28	27 to 24	23 to 00
Area	Specifiable range		Areas	Bank number	Storage word address
DM	D00000 to D32767		0 (hex)	Always 0	000000 to 032767 (BCD)
CIO	CIO 0000 to CIO 6143		1 (hex)	Always 0	000000 to 006143 (BCD)
WR	W000 to W511		2 (hex)	Always 0	000000 to 000511 (BCD)
HR	H000 to H511		3 (hex)	Always 0	000000 to 000511 (BCD)
EM	00000 to 32767		5 (hex)	0 to C (hex)	000000 to 032767 (BCD)

Note You cannot use Holding Area H512 and subsequent holding areas, and EM Bank D and subsequent banks.

Additional Information

- If there is a mistake in designating the command and option, the Command Error (*_Ch1_CmdEr*, *_Ch2_CmdErr*) in the Results Information will turn ON, and the command will not be executed.
- If there is a mistake in designating the Data Storage Area, the Data Storage Area Specification Error (*_Ch1_DatStorageAreaErr*, *_Ch2_DatStorageAreaErr*) in the Results Information will turn ON, and the command will not be executed.

Input Variable

Antenna 1

Variable names	Type	R/W	Classification	Item	Function	Setting value
*_Ch1_IDBusySta	BOOL	R	Unit Status	ID Busy	Becomes 1 during communication processing for Antenna 1.	---
*_Ch1_NormEndSta	BOOL	R		Command Normal End	Becomes 1 for one task period when *_*Ch1_ExecCmd* is set to 1 and processing ends normally.	---
*_Ch1_ErrEndSta	BOOL	R		Command Error End	Becomes 1 for one task period if an error occurs while processing is in progress after setting *_*Ch1_ExecCmd* to 1.	---
*_Ch1_AntTypErr	BOOL	R		Antenna Error	Becomes 1 in the cases below: *_*Ch1_AntConn* (Antenna Connection Setting) does not match the connected Antenna. Or the V680-H01 or V680-H01-V2 Antenna is connected to the CJ1W-V680C12.	---
*_Ch1_MemErr	BOOL	R		Memory Error	Becomes 1 when there is an error in ID Sensor Unit memory.	---
*_Ch1_AntPwrSplyErr	BOOL	R		Antenna Power Supply Error	Becomes 1 when an Antenna power supply (24 V) error occurs.	---
*_Ch1_TestMdSta	BOOL	R		Test Mode	Becomes 1 during Test Mode.	---
*_Ch1_UnitBusySta	BOOL	R		Unit Busy	Becomes 1 when there is an ID Sensor Unit error.	---

Variable names	Type	R/W	Classification	Item	Function	Setting value
*_Ch1_CmdErr	BOOL	R	Results Information	Command Error	• Becomes 1 when there is an error in the setting for the Command, Communications Specification, Processing Address, or Number of Processing Bytes. • Becomes 1 when an attempt is made to execute the Copy command for the CJ1W-V680C11.	---
*_Ch1_DatStorage AreaErr	BOOL	R		Data Storage Area Specification Error	Becomes 1 when an illegal area is specified for the Data Storage Area.	---
*_Ch1_ErrCorrection	BOOL	R		Error Correction	Becomes 1 when a 1-bit error correction was performed for a Read with Error Correction command.	---
*_Ch1_IDTagSta	BOOL	R		ID Tag Status	• Becomes 1 for a Calculation Write command if addition results in an overflow or subtraction results in an underflow. • Becomes 1 when a difference is found for the verification results for a Data Check command. • Becomes 1 for a Copy command if an error occurs when writing after data is read. • Becomes 1 when a 2-bit or larger memory error cannot be corrected by the Read with Error Correction command.	---
*_Ch1_IDSysErr3	BOOL	R		ID System Error 3	Becomes 1 when an ID system error occurs.	---
*_Ch1_IDSysErr2	BOOL	R		ID System Error 2	Becomes 1 when an ID system error occurs.	---
*_Ch1_IDSysErr1	BOOL	R		ID System Error 1	Becomes 1 when an ID system error occurs.	---

Variable names	Type	R/W	Classification	Item	Function	Setting value
*_Ch1_IDTagMissingErr	BOOL	R	Results Information	ID Tag Missing Error	• Becomes 1 when the communications specification is designated as a trigger but there is no ID Tag in the Antenna 1 communications area. • Becomes 1 when there is no ID Tag in the Antenna 1 communications area when the Auto Wait Time elapses and the communications specification is designated as a single auto.	---
*_Ch1_WrProtErr	BOOL	R		Protection Error	• Becomes 1 when an attempt is made to write to a write-protected area. • Becomes 1 when the ID Tag is not an applicable model.	---
*_Ch1_IDTagCommErr	BOOL	R		ID Tag Communications Error	Becomes 1 when communications cannot be completed normally because an error occurred in communications with the ID Tag.	---
*_Ch1_IDTagAdrErr	BOOL	R		ID Tag Address Error	Becomes 1 when execution is not possible because *_*Ch1_ProcAdr* (Processing Address) is not specified correctly.	---
*_Ch1_VefyErr	BOOL	R		Verification Error	Becomes 1 when data cannot be written correctly to the ID Tag if the Verification processing setting (*_*Ch1_SysSet* bits 07 to 04) is set to "Verify."	---
*_Ch1_AntErr	BOOL	R		Antenna Error	Becomes 1 when an error occurs because an Antenna 1 is not connected.	---
*_Ch1_ProcRsltMon	WORD	R	Processing Results Monitor		■ **Normal Mode (*_*Ch1_ProcRslt MonCfg* = 0)** Indicates the communications time for the last command execution.	Normal end: Processing time (1 to 9999 × 10 ms) Max. error: 10 ms Error end: "E0" + <Error Code>*
					■ **Normal Mode (*_*Ch1_ProcRslt MonCfg* = 1)** Indicates the noise level around the Antenna during the last command execution.	Normal end: "C0" + "00" to "99" Measurement error: "E0" + <Error Code>*
					■ **Test Mode** Indicates the result of the Test Mode currently running.	Normal end: "Command Code" + <Results> Error end: "E0" + <Error Code>*

* Becomes 0000 when the controller is reset, the Unit is restarted or command execution starts.

Antenna 2

Variable names	Type	R/W	Classification	Item	Function	Setting value
*_Ch2_IDBusySta	BOOL	R	Unit Status	ID Busy	Becomes 1 during communication processing for Antenna 2.	---
*_Ch2_NormEndSta	BOOL	R		Command Normal End	Becomes 1 for one task period when *_*Ch2_ExecCmd* is set to 1 and processing ends normally.	---
*_Ch2_ErrEndSta	BOOL	R		Command Error End	Becomes 1 for one task period if an error occurs while processing is in progress after setting *_*Ch2_ExecCmd* to 1.	---
*_Ch2_AntTypErr	BOOL	R		Antenna Error	Becomes 1 in the cases below: *_*Ch2_AntConn* (Antenna Connection Setting) does not match with the connected Antenna. Or the V680-H01 or V680-H01-V2 Antenna is connected to the CJ1W-V680C12.	---
*_Ch2_MemErr	BOOL	R		Memory Error	Becomes 1 when there is an error in ID Sensor Unit memory.	---
*_Ch2_AntPwrSplyErr	BOOL	R		Antenna Power Supply Error	Becomes 1 when an Antenna power supply (24 V) error occurs.	---
*_Ch2_TestMdSta	BOOL	R		Test Mode	Becomes 1 during Test Mode.	---
*_Ch2_UnitBusySta	BOOL	R		Unit Busy	Becomes 1 when there is an ID Sensor Unit error.	---

Variable names	Type	R/W	Classification	Item	Function	Setting value
*_Ch2_CmdErr	BOOL	R	Results Information	Command Error	Becomes 1 when there is an error in the setting for the Command, Communications Specification, Processing Address, or Number of Processing Bytes.	---
*_Ch2_DatStorage AreaErr	BOOL	R		Data Storage Area Specification Error	Becomes 1 when an illegal area is specified for the Data Storage Area.	---
*_Ch2_ErrCorrection	BOOL	R		Error Correction	Becomes 1 when a 1-bit error correction was performed for a Read with Error Correction command.	---
*_Ch2_IDTagSta	BOOL	R		ID Tag Status	• Becomes 1 for a Calculation Write command if addition results in an overflow or subtraction results in an underflow. • Becomes 1 when a difference is found for the verification results for a Data Check command. • Becomes 1 for a Copy command if an error occurs when writing after data has been read. • Becomes 1 when a 2-bit or larger memory error cannot be corrected by the Read with Error Correction command.	---
*_Ch2_IDSysErr3	BOOL	R		ID System Error 3	Becomes 1 when an ID system error occurs.	---
*_Ch2_IDSysErr2	BOOL	R		ID System Error 2	Becomes 1 when an ID system error occurs.	---
*_Ch2_IDSysErr1	BOOL	R		ID System Error 1	Becomes 1 when an ID system error occurs.	---
*_Ch2_IDTagMissingErr	BOOL	R		ID Tag Missing Error	• Becomes 1 when the communications specification is designated as a trigger but there is no ID Tag in the Antenna 2 communications area. • Becomes 1 when there is no ID Tag in the Antenna 2 communications area when the Auto Wait Time elapsed and communications specification is designated as a single auto.	---

Variable names	Type	R/W	Classification	Item	Function	Setting value
*_Ch2_WrProtErr	BOOL	R	Results Information	Protection Error	• Becomes 1 when an attempt is made to write to a write-protected area. • Becomes 1 when the ID Tag is not an applicable model.	---
*_Ch2_IDTagCommErr	BOOL	R		ID Tag Communications Error	Becomes 1 when communications cannot be completed normally because an error occurred in communications with the ID Tag.	---
*_Ch2_IDTagAdrErr	BOOL	R		ID Tag Address Error	Becomes 1 when execution is not possible because *_Ch2_ProcAdr* (Processing Address) is not specified correctly.	---
*_Ch2_VefyErr	BOOL	R		Verification Error	Becomes 1 when data cannot be written correctly to the ID tag if the Verification processing setting (*_Ch1_SysSet* bits 07 to 04) is set to "Verify."	---
*_Ch2_AntErr	BOOL	R		Antenna Error	Becomes 1 when an error occurs because an Antenna is not connected.	---
*_Ch2_ProcRsltMon	WORD	R	Processing Results Monitor		■ **Normal Mode (*_Ch2_ProcRsltMonCfg* = 0)** Indicates the communications time for the last command execution.	Normal end: Processing time (1 to 9999 × 10 ms) Max. error: 10 ms Error end: "E0" + <Error Code>*
					■ **Normal Mode (*_Ch2_ProcRsltMonCfg* = 1)** Indicates the noise level around the Antenna during the last command execution.	Normal end: "C0" + "00" to "99" Measurement error: "E0" + <Error Code>*
					■ **Test Mode** Indicates the result of the Test Mode currently running.	Normal end: "Command Code" + <Results> Error end: "E0" + <Error Code>*

Note You can use input variables for Antenna 2 only with CJ1W-V680C12.

* Becomes 0000 when the controller is reset, the Unit is restarted or command execution starts.

● Processing Results Monitor Data

Run Mode

	Input variable	*_Ch1_ProcRsltMon *_Ch2_ProcRsltMon			
	Bits	15 to 12	11 to 08	07 to 04	03 to 00
When the power supply is turned ON or communications are started		0	0	0	0
At a normal end		Processing time (1 to 9999 × 10 ms) (hex) or Noise level (C0000 to C099)			
At an error end		E	0	Error code	

Communications Test Mode

	Input variable	*_Ch1_ProcRsltMon *_Ch2_ProcRsltMon			
	Bits	15 to 12	11 to 08	07 to 04	03 to 00
When the power supply is turned ON or communications are started		0	0	0	0
At a normal end		Processing time (1 to 9999 × 10 ms) (hex)			
At an error end		E	0	Error code	

Distance Level Measurement

	Input variable	*_Ch1_ProcRsltMon *_Ch2_ProcRsltMon			
	Bits	15 to 12	11 to 08	07 to 04	03 to 00
At a normal end		A	0	Distance level measurement results (00 to 06)	
At an error end		E	0	Error code	

Precautions for Correct Use

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed.

Read Speed Level Measurement

	Input variable	*_Ch1_ProcRsltMon *_Ch2_ProcRsltMon			
	Bits	15 to 12	11 to 08	07 to 04	03 to 00
When the power supply is turned ON or communications are started		0	0	0	0
At a normal end		B	0	Read speed level measurement results (EE, 01 to 06)	
At an error end		E	0	Error code	

Precautions for Correct Use

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed.

Write Speed Level Measurement

	Input variable	*_Ch1_ProcRsltMon *_Ch2_ProcRsltMon			
	Bits	15 to 12	11 to 08	07 to 04	03 to 00
When the power supply is turned ON or communications are started		0	0	0	0
At a normal end		B	1	Write speed level measurement results (EE, 01 to 06)	
At an error end		E	0	Error code	

Precautions for Correct Use

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed.

Noise Level

	Input variable	*_Ch1_ProcRsltMon *_Ch2_ProcRsltMon			
	Bits	15 to 12	11 to 08	07 to 04	03 to 00
At a normal end		C	0	Noise level measurement results (00 to 99)	
At an error end		E	0	Error code	

Precautions for Correct Use

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed.

Read Communications Success Rate Measurement

	Input variable	*_Ch1_ProcRsltMon *_Ch2_ProcRsltMon			
	Bits	15 to 12	11 to 08	07 to 04	03 to 00
At a normal end		C	1	Communications success rate measurement results (EE, 01 to 99) (100%: FF)	
At an error end		E	0	Error code	

Precautions for Correct Use

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed.

● Error Codes

Error classification	Error code	Error
Communications error with ID Tag	7C	Antenna error flag
	71	Verification error flag
	7A	ID tag address error flag
	70	ID Tag communications error
	7D	Protection error flag
	72	ID tag missing error flag
	79	ID system error 1
	7E	ID system error 2
	7F	ID system error 3
	76	ID Tag Status
	77	Error correction flag
Host communications error	14	Data storage area specification error, command error

4

ID Sensor Unit Functions

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4-1 Operating Modes

The ID Sensor Unit has two operating modes: Run Mode and Test Mode

There are two ways to switch between the two operating modes.

1. The test switch on the Unit's front panel
2. A software switch in memory

4-1-1 Run Mode

In Run Mode, communications are performed when the Command Execution Bit (*_Ch1_ExecCmd*, *_Ch2_ExecCmd*) in the device variable for CJ-series Unit is turned ON. All commands can be used in this mode. Communications results and Unit status are shown on the status indicators and in the input variables of each antenna.

4-1-2 Test Mode

Test Mode is used to simulate actual operation. In Test Mode, communications capability can be measured easily in the actual operating environment. Test Mode is also useful for checking the installation and the system operation. The following five operations can be performed in Test Mode.

Operation	Description
ID Tag communications test	Executes communications with an ID Tag and outputs the results to the Processing Results Monitor (*_Ch1_ProcRsltMon*, *_Ch2_ProcRsltMon*). When using a Two-channels ID Sensor Unit, the test will be performed alternately for Antennas 1 and 2.
Distance level measurement	Measures the Antenna and ID Tag installation distance in relation to the ID Tag communications range. The measurement results are output to the Processing Results Monitor (*_Ch1_ProcRsltMon*, *_Ch2_ProcRsltMon*). The results can also be checked on the Amplifiers operation indicators.
Write/read speed level measurement	Measures the number of times that communications can be performed consecutively based on the speed that ID Tags pass through the Antenna communications range. The measurement results are output to the Processing Results Monitor (*_Ch1_ProcRsltMon*, *_Ch2_ProcRsltMon*). The results can also be checked on the Amplifiers operation indicators.
Noise level measurement	Measures the ambient noise level in the installation environment. The measurement results are output to the Processing Results Monitor (*_Ch1_ProcRsltMon*, *_Ch2_ProcRsltMon*).
Communications success rate measurement	Communicates 100 times with an ID Tag with no retries. The measurement results are output to the Processing Results Monitor (*_Ch1_ProcRsltMon*, *_Ch2_ProcRsltMon*).

Precautions for Correct Use

When a V680-H01 Antenna is connected, tests other than the ID Tag communications test cannot be performed. Even if a Test Mode for other than the ID Tag communications test is selected, the ID Tag communications test operation will be performed.

Additional Information

- If the ID Sensor Unit is changed to ID Tag Communications Test Mode while a command is being executed, command execution will be completed and then the mode will be changed to the ID Tag Communications Test Mode.
- If an ID Sensor Unit error occurs, communications will stop regardless of the operating mode.

Using the Test Mode

1 Set the operation in Test Mode

The operation to be performed in Test Mode is set in Initial Settings Data. The settings are listed in the following table.
There are 3 Test Setting Data items: Test Operation (*_*TestExec*), Test Antenna (*_*AntForTest*) and Number of Test Bytes (*_*ByteForTest*).

Test Operation (*_TestExec)	• ID Tag communications test • Distance level • Read speed level • Write speed level • Noise level • Communications success rate
Test Antenna (*_AntForTest)	• Antenna 1 • Antenna 2
Number of Test Bytes (*_ByteForTest)	0 to 2048 bytes
Run/Test Switching Method (*_ByteForTest)	• CPU Unit operates RUN/TEST Bit (Antenna#) (*Ch#_RunTestChg*). • Test switch

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of the Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

Additional Information

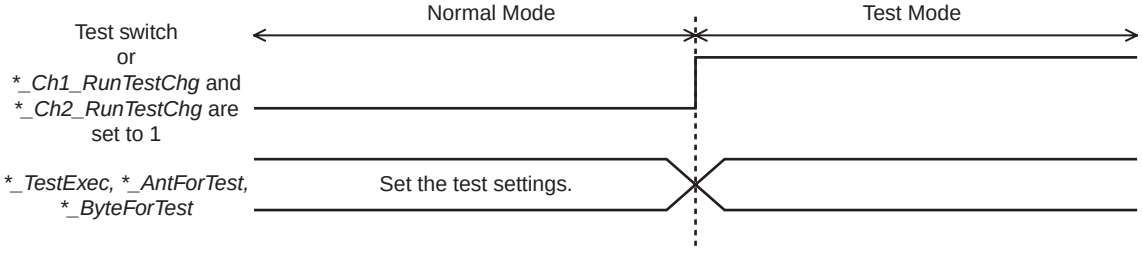
For details on the settings for the operation in Test Mode, refer to *4-3-6 Run/Test Switching Method Setting (*_MethChgRunTest)*.

2 Turn ON the test switch.

The Test operation is started using the method set in Test Settings Data.

Precautions for Correct Use

The test that is performed cannot be changed after the system enters into Test Mode, even if Test Settings Data is changed. Always set the Test Settings Data before the system enters into Test Mode.



ID Tag Communications Test

An ID Tag communications test is used to execute communications with an ID Tag and output the results to the input variables for Processing Results Monitor (*_Ch1_ProcRsltMon*, and **_Ch2_ProcRsltMon*) in device variables for CJ-series Unit. When using a Two-channels ID Sensor Unit, the test will be performed alternately for Antennas 1 and 2.

Additional Information

- The ID Tag communications test checks only the read operation and does not check the write operation.
- The communications test will be performed with the pre-set settings in the Test Settings Data. In the communications test, communications are executed alternatively for Antennas 1 and 2, regardless of the specified Antenna number.

1 Set the method to use to switch between Run Mode and Test Mode.

To start Test Mode by using the test switch on the front panel, set the Run/Test Switching Method Setting *(*_MethChgRunTest)* to *Test Switch*.

To start Test Mode using **_Ch1_RunTestChg* and **_Ch2_RunTestChg*, set the Run/Test Switching Method Setting *(*_MethChgRunTest)* to *CPU Unit*.

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

2 Set the operation to perform in Test Mode.

Set the Test Operation to Communications Test and set the number of test bytes.

3 Turn ON the test switch.

The operation in Test Mode is started using the Initial Settings Data.

4 Communications with the ID Tag will begin.

Communications will be performed with the ID Tag and the communications results will be output to the input variables for Processing Results Monitor (**_Ch1_ProcRsltMon* and **_Ch2_ProcRsltMon*) in device variables for CJ-series Unit.

Distance Level Measurement

A distance level measurement allows for easy checking of the installation positions of Antennas and ID Tags.

This test operation measures the Antenna and ID Tag installation distance in relation to the ID Tag communications range. The measurement results are output to the input variables for Processing Results Monitor (*_Ch1_ProcRsltMon* and *_Ch2_ProcRsltMon*) in device variables for CJ-series Unit. The measurement results can also be checked on the Amplifiers operation indicators.

Precautions for Correct Use

The distance level changes a great deal depending on the ambient environment. Use it as a reference data for the installation position and test operation sufficiently in Run Mode in the actual installation environment. Levels higher than distance level 4 may not be displayed, but this does not indicate an error and performance in Run Mode will not be affected.

Additional Information

The distance level is measured using the pre-set settings in Test Settings Data.

1 Set the method to use to switch between Run Mode and Test Mode.

To start Test Mode by using the test switch on the front panel, set the Run/Test Switching Method Setting *(*_MethChgRunTest)* to *Test Switch*.

To start Test Mode using **_Ch1_RunTestChg* and **_Ch2_RunTestChg*, set the Run/Test Switching Method Setting *(*_MethChgRunTest)* to *CPU Unit*.

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

2 Set the operation to perform in Test Mode.

Set the Test Operation to Distance level and set the number of test bytes and the test antenna.

3 Turn ON the test switch.

The distance level is measured using the method set in the Initial Settings Data Area.

4 Distance level measurement will begin.

The distance level will be measured and the communications results will be output to the input variables for Processing Results Monitor (**_Ch1_ProcRsltMon* and **_Ch2_ProcRsltMon*) in device variables for CJ-series Unit. You can also check the measurement results on the Amplifier's operation indicators.

Write/Read Speed Level Measurement

A speed level measurement can be used for measuring the moving speed of ID Tags and number of usable bytes. This function measures the number of times that the system can perform communications consecutively based on the speed that ID tags pass through the Antenna communications range. The measurement results are output to the input variables for Processing Results Monitor (**_Ch1_ProcRsltMon* and **_Ch2_ProcRsltMon*) in device variables for CJ-series Unit. The measurement results can also be checked on the Amplifier's operation indicators.

Additional Information

- The speed level measurement operation simulates writing data. Data is not actually written to the ID Tag.
- The speed level measurement will be performed with the pre-set settings in Test Settings Data.

1 Set the method to use to switch between Run Mode and Test Mode.

To start Test Mode by using the test switch on the front panel, set the Run/Test Switching Method Setting *(*_MethChgRunTest)* to *Test Switch*.

To start Test Mode using **_Ch1_RunTestChg* and **_Ch2_RunTestChg*, set the Run/Test Switching Method Setting *(*_MethChgRunTest)* to *CPU Unit*.

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of the Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

2 Set the operation to perform in Test Mode.

Set the Test Operation to Speed level (Read) or Speed level (Write) and set the number of test bytes and the test antenna.

3 Turn ON the test switch.

Measuring the speed level is started using the Initial Settings Data.

4 Speed level measurement will begin.

The speed level will be measured and the communications results will be output to the input variables for Processing Results Monitor *(*_Ch1_ProcRsltMon* and *_Ch2_ProcRsltMon)* in device variables for CJ-series Unit. The measurement results can also be checked on the Amplifier's operation indicators.

Noise Level Measurement

A noise level measurement enables checking for spatial noise, noise sources, and the effectiveness of noise countermeasures.

This operation measures the ambient noise level in the installation environment. The measurement results are output to the input variables for Processing Results Monitor (*_Ch1_ProcRsltMon* and *_Ch2_ProcRsltMon*) in device variables for CJ-series Unit.

Additional Information

The noise level measurement will be performed with the pre-set settings in Test Settings Data.

1 Set the method to use to switch between Run Mode and Test Mode.

To start Test Mode by using the test switch on the front panel, set the Run/Test Switching Method Setting *(*_MethChgRunTest)* to *Test Switch*.

To start Test Mode using *_Ch1_RunTestChg* and *_Ch2_RunTestChg*, set the Run/Test Switching Method Setting *(*_MethChgRunTest)* to *CPU Unit*.

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of the Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

2 Set the operation to perform in Test Mode.

Set the Test Operation to Noise level and set the number of test bytes and the test antenna.

3 Turn ON the test switch.

Measuring the noise level is started using the Initial Settings Data.

4 Noise level measurement will begin.

The noise level will be measured and the communications results will be output to the input variables for Processing Results Monitor (**_Ch1_ProcRsltMon* and **_Ch2_ProcRsltMon*) in device variables for CJ-series Unit.

Communications Success Rate Measurement

The communications success rate measurement is used to check the communications success rate. The ID Sensor Unit communicates 100 times with an ID Tag and outputs the measurement results to the input variables for Processing Results Monitor (*_Ch1_ProcRsltMon* and *_Ch2_ProcRsltMon*) in device variables for CJ-series Unit.

Additional Information

- The communications success rate is measured using read operations.
- The noise level measurement will be performed with the pre-set settings in the Test Settings Data.

1 Set the method to use to switch between Run Mode and Test Mode.

To start Test Mode by using the test switch on the front panel, set the Run/Test Switching Method Setting *(*_MethChgRunTest)* to *Test Switch*.

To start Test Mode using **_Ch1_RunTestChg* and **_Ch2_RunTestChg*, set the Run/Test Switching Method Setting *(*_MethChgRunTest)* to *CPU Unit*.

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

2 Set the operation to perform in Test Mode.

Set the Test Operation to Communications success rate and set the number of test bytes and the test antenna.

3 Turn ON the test switch

The communications success rate measurement will be performed with the pre-set settings in the Initial Settings Data Area.

4 Communications success rate measurement will begin.

The communications success rate will be measured and the communications results will be output to the input variables for Processing Results Monitor (**_Ch1_ProcRsltMon* and **_Ch2_ProcRsltMon*) in device variables for CJ-series Unit.

4-2 Communications Specifications

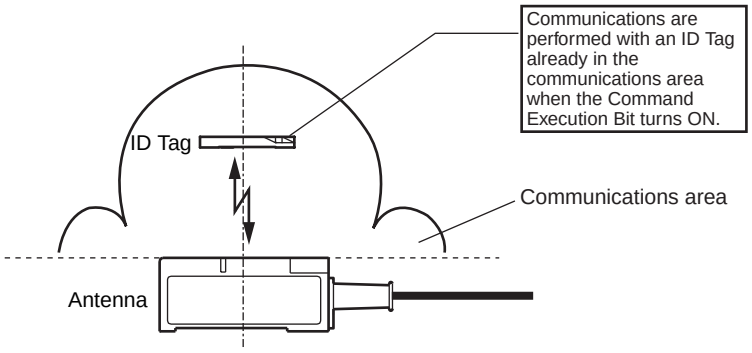
There are seven execution sequences that can be used to communicate with the ID Tag. The sequence is specified in bits 07 to 04 of Command Setting (*_*Ch1_CmdSet* and **_Ch2_CmdSet*).

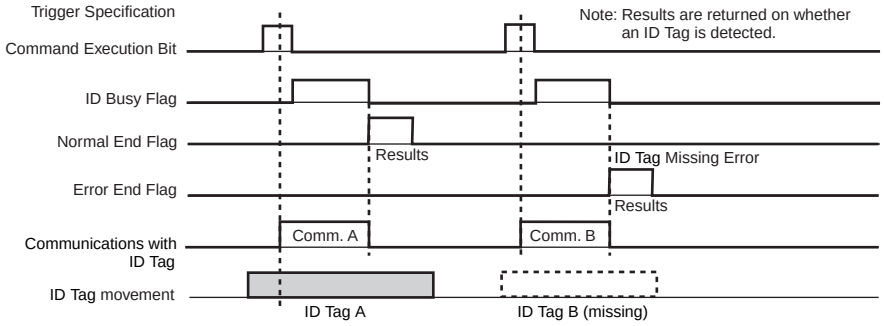
Name	Communications specification	Description
Trigger	0	When the Command Execution Bit turns ON, communications are performed with the ID Tag in the communications area and processing is ended.
Single auto	1	After the Command Execution Bit turns ON, the ID Sensor Unit waits until an ID Tag is detected in the communications area, communications are performed, and processing is ended.
Repeat auto	2	The operation for a single auto specification is repeated. Once communications have been completed with a specific ID Tag, communications will not be performed with it again even if it remains in the communications area. Processing is ended when the Abort Bit is turned ON.
FIFO trigger*	3	When the ID Sensor Unit receives a command, it communicates with an ID Tag and returns a response. After communicating, all further operations with that ID Tag are prohibited. The ID Sensor Unit communicates with only one ID Tag in the communications area. If an ID Tag that has been communicated with for a trigger specification is within the communications area, the ID Sensor Unit will not communicate with it again.
FIFO repeat*	4	When the ID Sensor Unit receives a command, it waits until an ID Tag is detected within the communications area, then returns a response. After communicating, all further operations with that ID Tag are prohibited. After returning the response, the ID Sensor Unit again waits for an ID Tag to approach it, and continues repeating the operation until the Abort Bit turns ON.
Multi-access trigger*	5	When the ID Sensor Unit receives a command, it communicates with all ID Tags in the communications area, returns responses in order. After communicating, all further operations with those ID Tags are prohibited. When communications with all ID Tags in the communications area have are complete, the ID Busy will turn OFF. When there is no ID tag in the antenna communications area, an ID Tag Missing Error Flag will be returned.
Multi-access repeat*	6	When the ID Sensor Unit receives a command, it waits for ID Tags to approach it. It communicates with all ID Tag in the communications area, and returns responses in order. After communicating, all further operations with those ID Tags are prohibited. After returning the responses, the ID Sensor Unit again waits for ID Tags to approach it, and continues repeating the operation until the Abort Bit turns ON.

* This sequence cannot be used for communications with the V680-D1KP□□.

4-2-1 Trigger

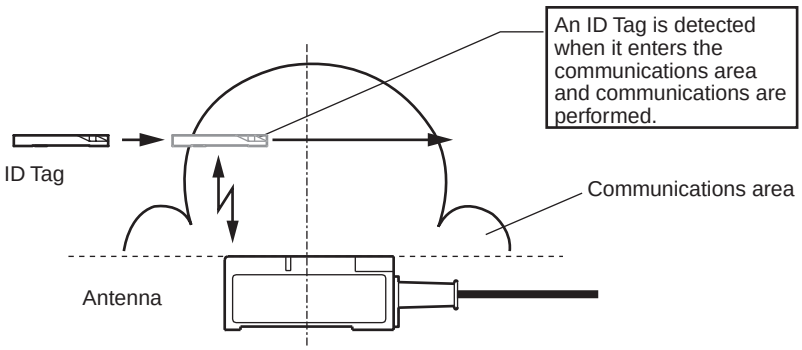
When a trigger is specified, communications are performed with the ID Tag when the Command Execution Bit (**_Ch#_ExecCmd*) in the Special I/O Unit Area turns ON and command execution is ended when communications have been completed. If there is no ID Tag in the communications area when the Command Execution Bit turns ON, ID Tag Missing Error (**_Ch#_IDTagMissingErr*) in the Results Information in the Special I/O Unit Area will turn ON and an error code (E072) will be stored in the Processing Results Monitor (**_Ch#_ProcRsltMon*). Use a sensor or other method to detect the presence of an ID Tag before turning ON the Command Execution Bit.

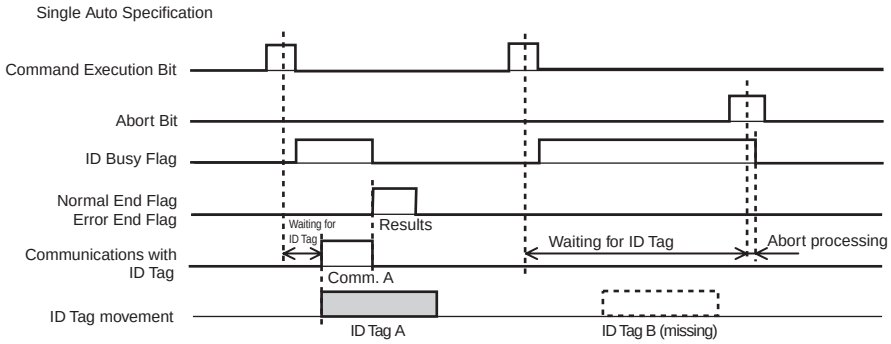




4-2-2 Single Auto

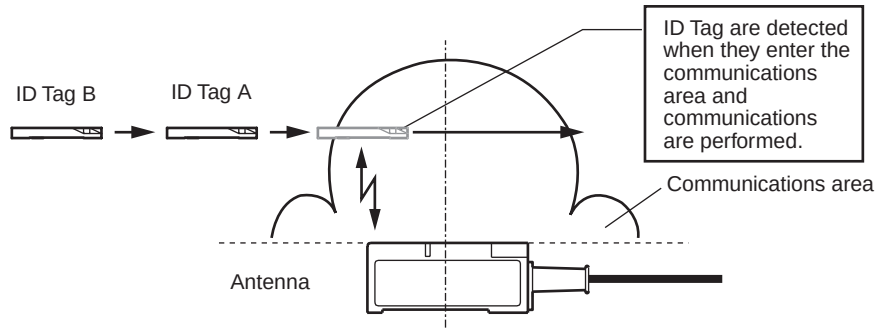
With a single auto specification, the presence of an ID Tag is automatically detected. It is not necessary to detect the ID Tag as is required for a trigger specification. Command execution is ended as soon as communications are completed with one ID Tag. The waiting operation for the ID Tag can be ended by turning ON the Abort Bit (*_Ch#_AbtCmd*).

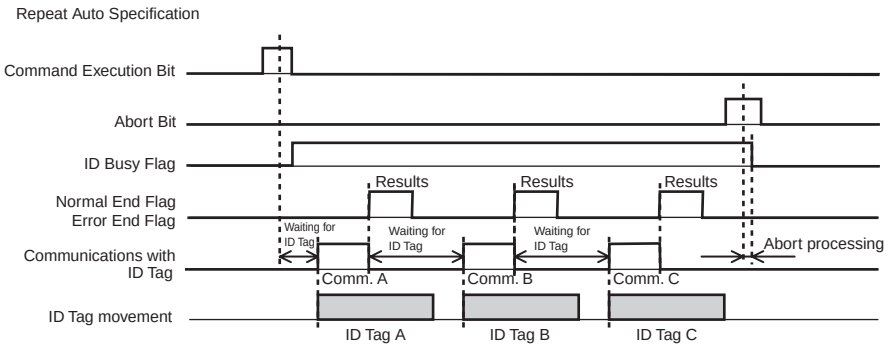




4-2-3 Repeat Auto

With a repeat auto specification, the presence of an ID Tag is automatically detected. It is not necessary to detect the ID Tag as is required for a trigger specification. As opposed to a single auto specification, command execution is not ended when communications with the first ID Tag have been completed, rather the ID Sensor Unit waits for the next ID Tag. Once communications have been completed with a specific ID Tag, communications will not be performed with it again even if it remains in the communications area. Repeat Auto execution can also be ended by turning ON the Abort Bit (*_Ch#_AbtCmd*).



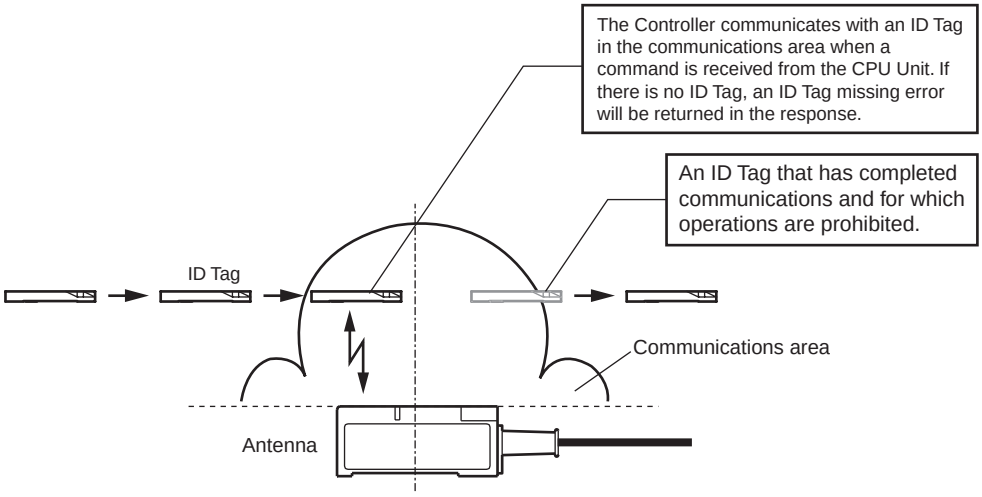


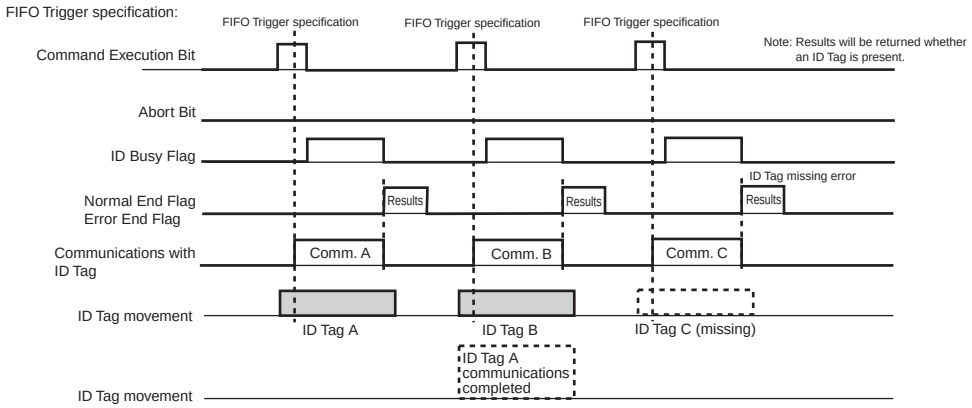
4-2-4 FIFO Trigger

With a FIFO trigger communications specification, communications are executed with a ID Tag when a command is sent. After communicating, the ID Sensor Unit returns a response. Operations are prohibited for ID Tags that have completed communications until they leave the communications area. After the ID Sensor Unit sends a response, it will wait for the next command. If there is no ID Tag in the communications area when the ID Sensor Unit receives the command from the CPU Unit, the ID Sensor Unit will return an ID Tag missing error.

With the FIFO trigger communications specification, even if there are ID Tags in the communications area that have completed communications, the ID Sensor Unit can still communicate with the next ID Tag.

Note Commands will be accepted for an Antenna that is not processing a command.





Precautions for Correct Use

- To communicate with ID Tags in the communications area that have completed communications, turn ON the Abort Bit in the Special I/O Unit Area (*_Ch#_AbtCmd*) to cancel processing.
- FIFO trigger specification cannot be used for communicating with V680-D1KP□□ ID Tags.

Additional Information

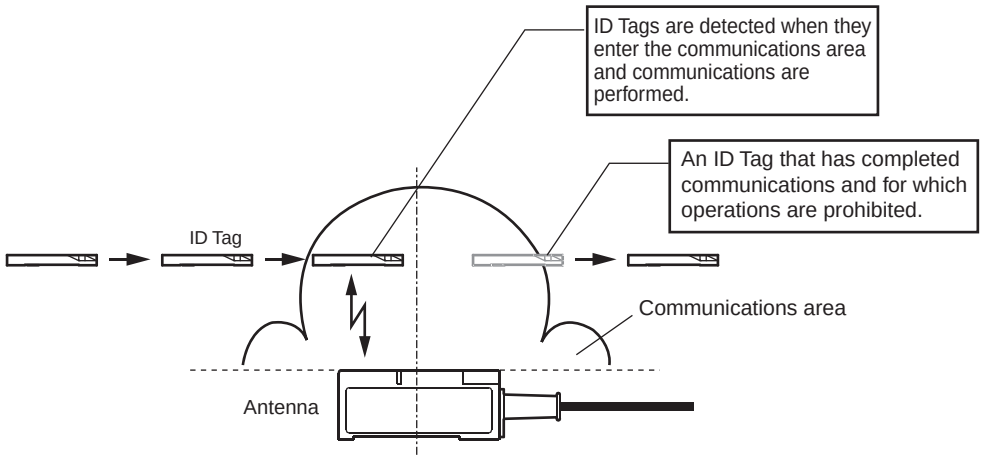
When using the V680-D2KF□□/-D□KF68 ID Tags with a FIFO trigger specification, the normal communications speed will be used regardless of the setting in Communications speed (bits 3 to 0 of *_Ch#_SysSet*).

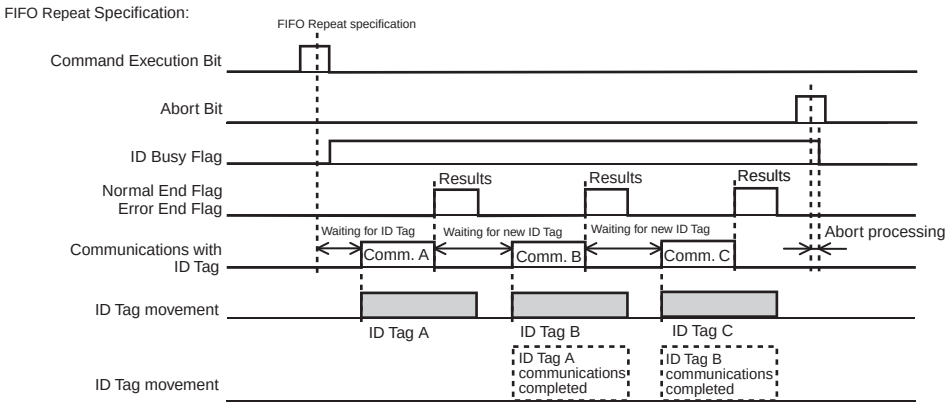
4-2-5 FIFO Repeat

With a FIFO repeat communications specification, the ID Sensor Unit automatically detects ID Tags that enter the communications area after a command is sent and communicates with them repeatedly. Operations are prohibited for ID Tags that have completed communications until they leave the communications area. After communicating, the ID Sensor Unit returns a response. ID Sensor Unit processing ends when the Abort Bit is turned ON. The ID Sensor Unit will wait for the next command.

With the FIFO repeat communications specification, even if there are ID Tags in the communications area that have completed communications, the ID Sensor Unit can still communicate with the next ID Tag.

Note Commands will be accepted for an Antenna that is not processing a command.





Precautions for Correct Use

FIFO repeat specification cannot be used for communicating with V680-D1KP□□ ID Tags.

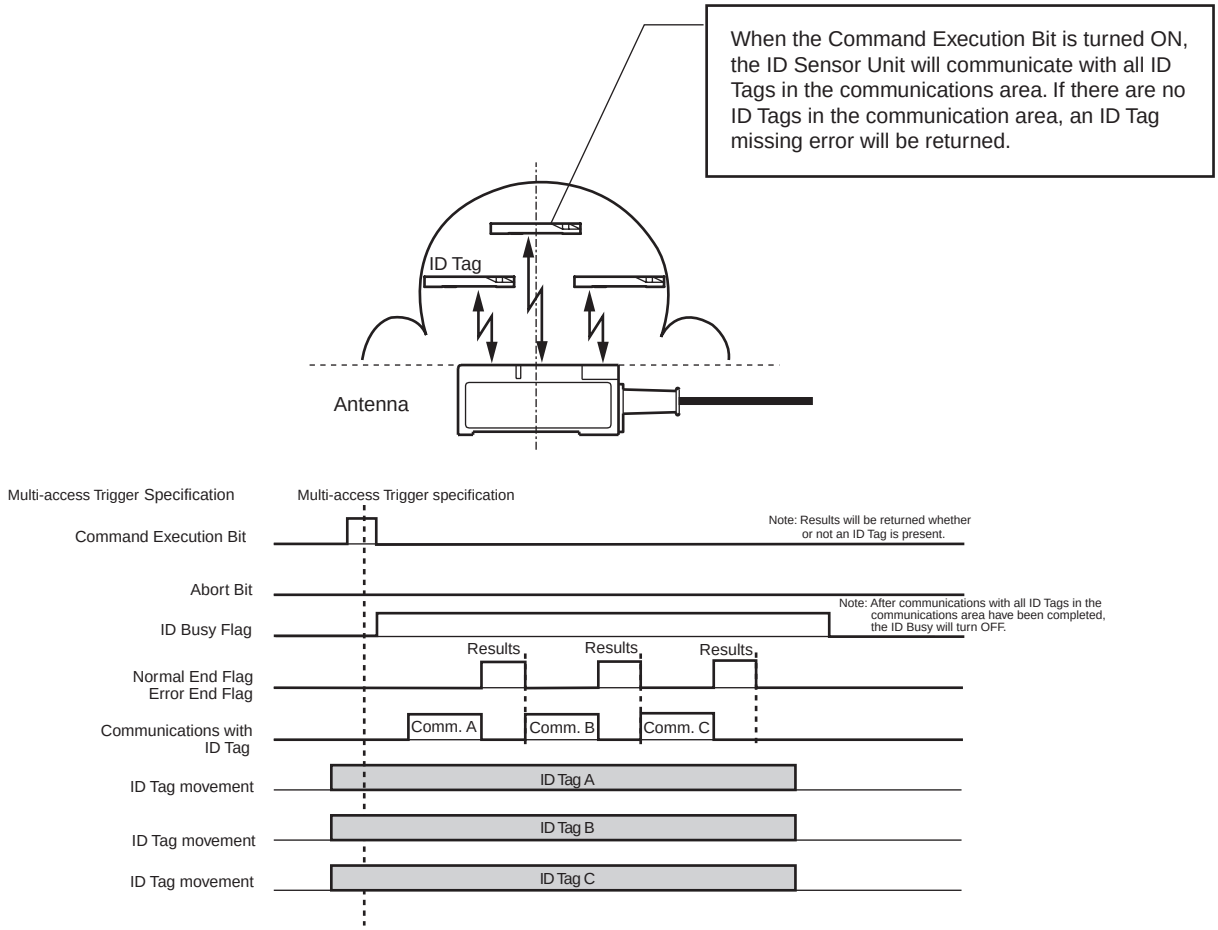
Additional Information

When using the V680-D2KF□□/-D□KF68 ID Tags with a FIFO repeat specification, the normal communications speed will be used regardless of the setting in Communications speed (bits 3 to 0 of **_Ch#_SysSet*).

4-2-6 Multi-access Trigger

With a multi-access trigger communications specification, communications are executed with multiple ID Tags when a command is sent. The ID Sensor Unit sends responses sequentially as communications with the ID Tags in the communications area are completed. Move the results data stored in the Data Storage Area to another area before the results data from the next ID Tag is stored. After the ID Sensor Unit has completed communications with all of the ID Tags in the communications area, the ID Busy will turn OFF, and the ID Sensor Unit will wait for the next command.

Note Commands will be accepted for an Antenna that is not processing a command.



Precautions for Correct Use

Multi-access trigger specification cannot be used for communicating with V680-D1KP□□ ID Tags.

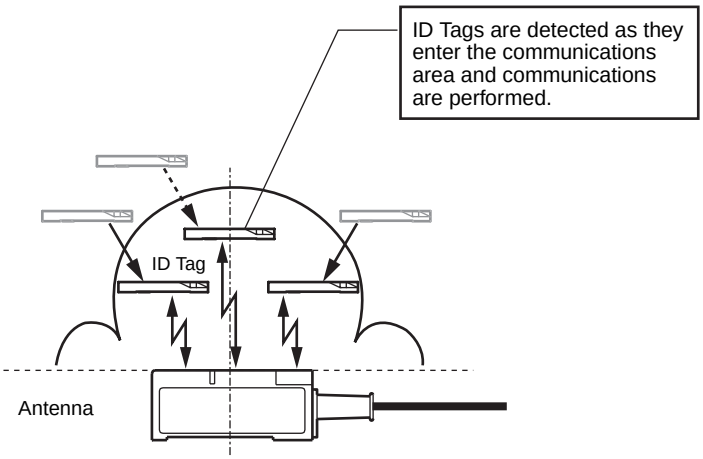
Additional Information

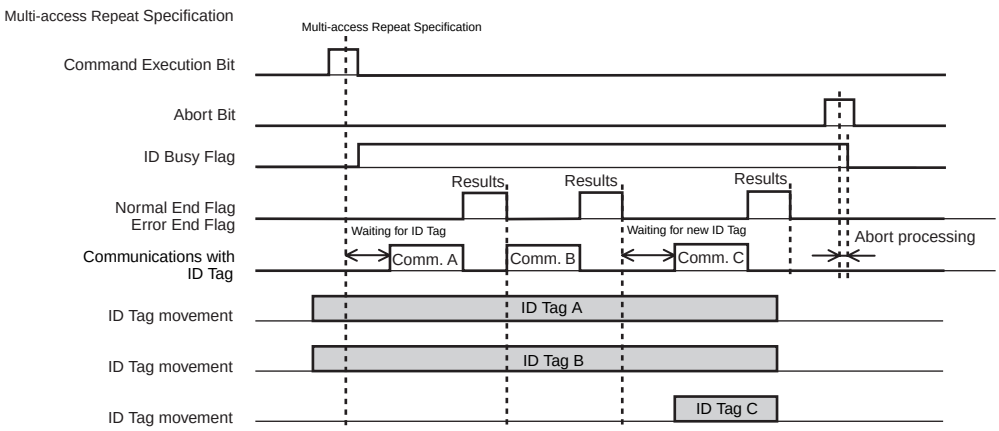
When using the V680-D2KF□□/-D□KF68 ID Tags with a multi-access trigger specification, the normal communications speed will be used regardless of the setting in Communications speed (bits 3 to 0 of *_Ch#_SysSet*).

4-2-7 Multi-access Repeat

With a multi-repeat communications specification, the ID Sensor Unit automatically detects multiple ID Tags that enter the communications area and communicates with them repeatedly when a command is sent. The ID Sensor Unit sends responses sequentially as communications with the ID Tags in the communications area are completed. Move the results data stored in the Data Storage Area to another area before the results data from the next ID Tag is stored. Even after the ID Sensor Unit has sent the responses, the ID Sensor Unit continues to automatically detect ID Tags that enter the communications area and communicates with them repeatedly. Operations are prohibited for ID Tags that have completed communications until they leave the communications area. ID Sensor Unit processing ends when the Abort Bit is turned ON. The ID Sensor Unit will wait for the next command.

Note Commands will be accepted for an Antenna that is not processing a command.





Precautions for Correct Use

Multi-access repeat specification cannot be used for communicating with V680-D1KP□□ ID Tags.

Additional Information

When using the V680-D2KF□□/-D□KF68 ID Tags with a multi-access repeat specification, the normal communications speed will be used regardless of the setting in Communications speed (bits 3 to 0 of *_Ch#_SysSet*).

4-3 Details of Initial Settings

The following Initial Settings Data can be configured for the user application to optimize the performance and reliability of the ID Sensor Unit.

- System Settings
- Auto Wait Time Setting
- Write Protection Setting
- Antenna Connection Setting
- Results Monitor Setting
- Run/Test Switching Method Setting

Although the default settings can be used for most applications, the parameters can be changed to optimize the system.

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of the Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

4-3-1 System Settings (*_Ch#_SysSet)

UID Addition Setting

These settings are used to set whether or not a UID will be added to the read command response.

● UID not added

*_*Ch1_SysSet* bit 15-12 = 16#0 (Default)

*_*Ch2_SysSet* bit 15-12 = 16#0 (Default)

● UID added

*_*Ch1_SysSet* bit 15-12 = 16#1

*_*Ch2_SysSet* bit 15-12 = 16#1

* If adding the UID is specified, the UID (8 bytes) will be appended to the front of the read response data.

Test Mode Enable/Disable Setting

Use this setting to enable or disable the Communications Test Mode switching by using the test switch on the front panel. You can disable the test switch to prevent accidentally entering Communications Test Mode.

● Test switch enabled

*_*Ch1_SysSet* bit 11-08 = 16#0 (Default)

*_*Ch2_SysSet* bit 11-08 = 16#0 (Default)

● Test switch disabled

_Ch1_SysSet bit 11-08 = 16#1

_Ch2_SysSet bit 11-08 = 16#1

Verification Processing Setting

Verification can be enabled for write operations, or verification can be disabled to shorten the communications time. The verification setting is valid for all commands except for Read and Data Check with a processing specification of verification.

● Verify write operations

_Ch1_SysSet bit 07-04 = 16#0 (Default)

_Ch2_SysSet bit 07-04 = 16#0 (Default)

● Do not verify write operations

_Ch1_SysSet bit 07-04 = 16#1

_Ch2_SysSet bit 07-04 = 16#1

Communications Speed Setting

High-speed communications can be specified whenever the communications method is set to trigger, single auto, or repeat auto.

● Communications speed setting: Normal

_Ch1_SysSet bit 03-00 = 16#0 (Default)

_Ch2_SysSet bit 03-00 = 16#0 (Default)

● Communications speed setting: High speed

_Ch1_SysSet bit 03-00 = 16#1

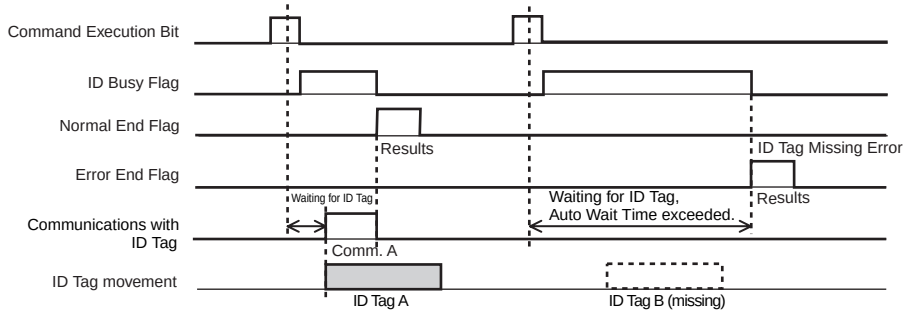
_Ch2_SysSet bit 03-00 = 16#1

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of the Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

4-3-2 Auto Wait Time Setting (*_Ch#_AutoWaitTm)

If a normal response is not received in communications with an ID Tag when the ID Tag has been detected, retry processing will be performed to resend the same command. Retry processing is performed until the Auto Wait Time has expired while the ID Sensor Unit is waiting for an ID Tag. The ID Tag wait status begins for a single auto specification, when command execution is started. From the second ID Tag for a repeat auto specification, it begins when communications with the previous ID Tag have been completed.



_Ch1_AutoWaitTm = 16#0000 to 16#9999 (Default: 16#0000)

_Ch2_AutoWaitTm = 16#0000 to 16#9999 (Default: 16#0000)

The Auto Wait Time Setting corresponds to the setting value times 0.1 seconds. Specified with 4-digit BCD. If 16#0000 is set, there is no timeout.

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of the Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

4-3-3 Write Protection Setting (*_Ch#_WrProt)

The write protection setting can be used to enable or disable the write protection settings in ID Tags.

Write protection enabled (V680 method)

**_Ch1_WrProt* = 0 (Default)

**_Ch2_WrProt* = 0 (Default)

Write protection disabled

**_Ch1_WrProt* = 1

**_Ch2_WrProt* = 1

Write protection enabled (V600 method)

**_Ch1_WrProt* = 2

**_Ch2_WrProt* = 2

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of the Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

4-3-4 Antenna Connection Setting (*_Ch#_AntConn)

Set the antenna to be connected.

Standard Antenna connected

**_Ch1_AntConn* = 0 (Default)

**_Ch2_AntConn* = 0 (Default)

V680-H01 or V680-H01-V2 Antenna connected

**_Ch1_AntConn* = 1

**_Ch2_AntConn* = 1

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of the Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

Precautions for Correct Use

V680-H01 and V680-H01-V2 can only be connected with a One-channel ID Sensor Unit. They cannot be connected to a Two-channels ID Sensor Unit.

4-3-5 Results Monitor Setting (*_Ch#_ProcRsltMonCfg)

Communications time

**_Ch1_ProcRsltMonCfg* = 0 (Default)

**_Ch2_ProcRsltMonCfg* = 0 (Default)

Noise level

**_Ch1_ProcRsltMonCfg* = 1

**_Ch2_ProcRsltMonCfg* = 1

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of the Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

4-3-6 Run/Test Switching Method Setting (*_MethChgRunTest)

You can switch between Normal Mode (RUN) and Test Mode (TEST) by using the test switch or by using RUN/TEST Bit (**_Ch1_RunTestChg* and **_Ch2_RunTestChg*).

Test switch

**_MethChgRunTest* = 16#0000 (Default)

CPU Unit RUN/TEST Bit (Antenna #) (Ch#_RunTestChg)

**_MethChgRunTest* = 16#0001

Precautions for Safe Use

- After Initial Settings Data is set and transferred from Sysmac Studio, Sysmac Studio confirms whether or not the unit must be restarted. Restart the unit after confirming the safety of the connected destination.
- The settings of the Initial Settings Data will be transferred to the Special I/O Unit when the Unit restarts or the Controller is reset, including when the power is turned ON.

4-3-7 Tag Memory Type Setting (*_TagMemTyp)

This setting can be used to set the ID Tag memory map to the map that is used with ID Controllers for Heat-resistant RFID Systems (V680-CA1D/-CA2D).

Normal Mode

**_TagMemTyp* = 0 (Default)

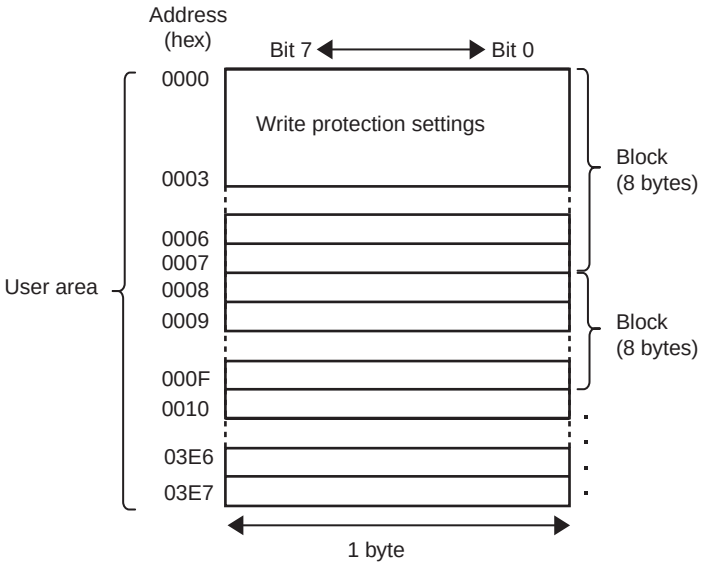
CA1D Mode

**_TagMemTyp* = 1

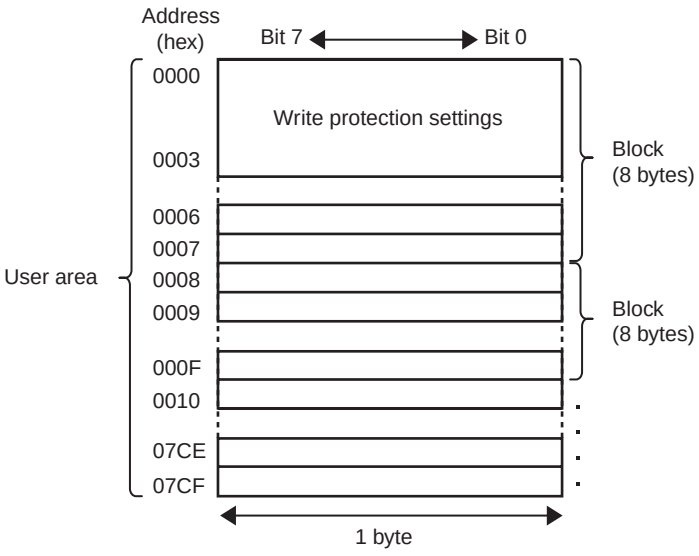
4-4 ID Tag Memory

The memory access area for the ID Sensor Unit is 64 Kbytes from addresses 0000 to FFFF (hex). The area that can actually be accessed is determined by the memory capacity of the ID Tag.

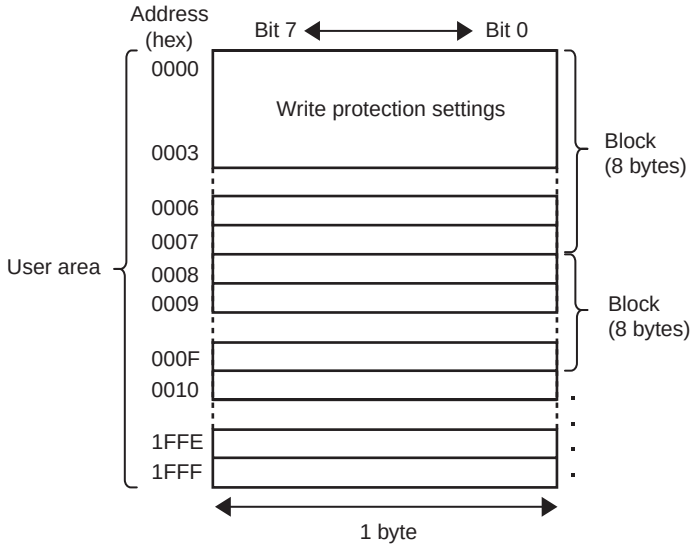
V680-D1KP□□ ID Tags



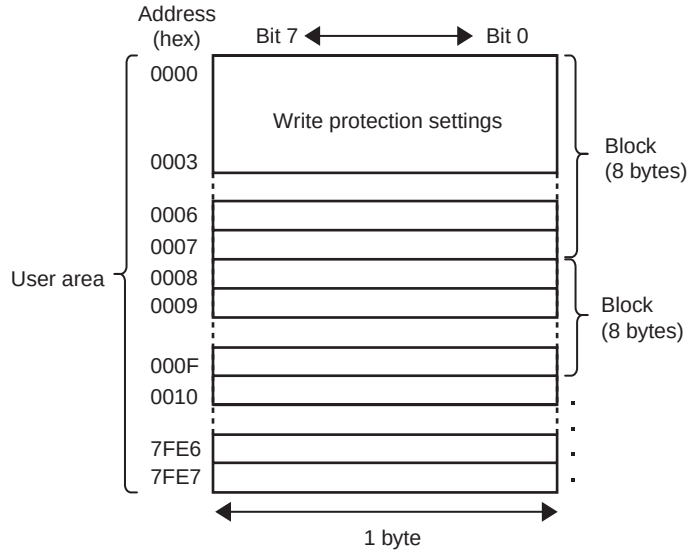
V680-D2KF□□ ID Tags



V680-D8KF□□ ID Tags



V680-D32KF68 ID Tags



4-5 Write Protection

The write protection function is provided so that product model numbers and other important product information stored in the ID Tags can be protected from being lost though careless write operations. We recommend that write protection be set after important data has been written.

Additional Information

Two write protection methods are available: the V680 method and V600 method. You can switch between the two modes by using **_Ch1_WrProt* and **_Ch2_WrProt* (Write Protection Enable/Disable Setting). Normally use the V680 method.

4-5-1 Setting Write Protection Using the V680 Method

Write protection is set in four bytes of ID Tag addresses 0000 to 0003 (hex). The setting for the most significant bit of address 0000 (hex) specifies whether or not write protection is enabled for the ID Tag.

Write Protection Setting Area in ID Tag Memory Map

Address/Bit	7	6	5	4	3	2	1	0
0000 hex	Enable/ Disable Bit	Upper two digits of start address (00 to 7F)						
0001 hex	Lower two digits of start address (00 to FF)							
0002 hex	Upper two digits of end address (00 to FF)							
0003 hex	Lower two digits of end address (00 to FF)							

- The most significant bit of address 0000 (hex) is the Write-protect Bit.
  1: Enable write protection
  0: Disable write protection
- Write Protection Setting Ranges
  Start address: 0000 to 7FFF hex
  End address: 0000 to FFFF hex

Precautions for Correct Use

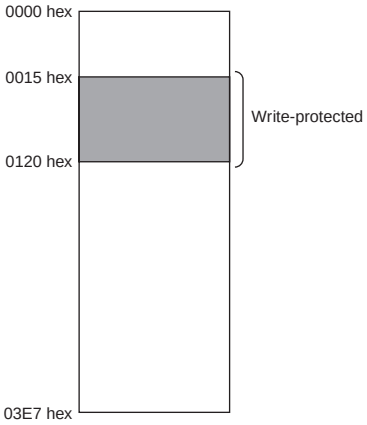
- If write protection is enabled, write separately to the write protection setting area (addresses 0000 to 0003 hex) and the rest of the ID Tag (addresses 0004 hex and higher). If the leftmost bit of address 0000 hex is 1 and you write both the write protection setting area (addresses 0000 to 0003 hex) and following addresses at the same time, a protection error will occur.
- If write protection is disabled, you can use the write protection setting area (addresses 0000 to 0003 hex) as normal user memory. If you use the write protection setting area (addresses 0000 to 0003 hex) as normal user memory, be sure to disable write protection in the ID Sensor Unit.

● Write Protection Setting Example

Start Address Lower Than End Address

All addresses from the start address to the end address, inclusive, will be write-protected.

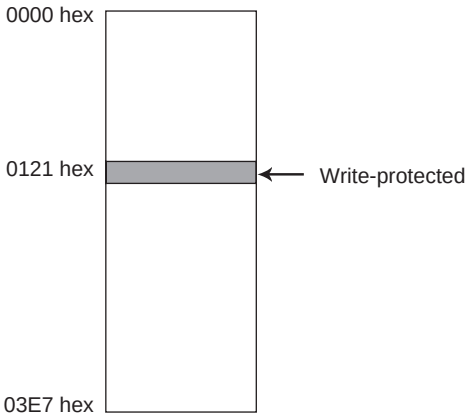
Address/Bit	Upper digit				Lower digit			
0000 hex	1	0	0	0	0	0	0	0
	8				0			
0001 hex	0	0	0	1	0	1	0	1
	1				5			
0002 hex	0	0	0	0	0	0	0	1
	0				1			
0003 hex	0	0	1	0	0	0	0	0
	2				0			



Start Address Equals End Address

Only the set address (1 byte) will be write-protected.

Address/Bit	Upper digit				Lower digit			
0000 hex	1	0	0	0	0	0	0	0
	8				0			
0001 hex	0	0	1	0	0	0	0	1
	2				1			
0002 hex	0	0	0	0	0	0	0	0
	0				0			
0003 hex	0	0	1	0	0	0	0	1
	2				1			



End Address Exceeds Last ID Tag Address

All addresses from the start address to the final address in the ID Tag, inclusive, will be write-protected.

Address/Bit	Upper digit				Lower digit			
0000 hex	1	0	0	0	0	0	1	1
	8				3			
0001 hex	0	0	0	0	0	0	0	0
	0				0			
0002 hex	0	0	0	0	0	0	1	1
	0				3			
0003 hex	1	1	1	1	1	1	1	1
	F				F			

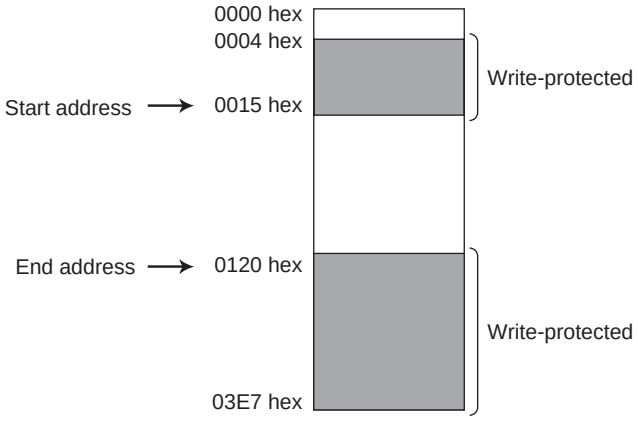
Additional Information

The write protection setting area in the ID Tag is not write-protected.

Start Address Greater Than End Address

All addresses from the start address to the final address and all addresses from address 0004 hex to the end address in the ID Tag, inclusive, will be write-protected.

Address/Bit	Upper digit				Lower digit			
0000 hex	1	0	0	0	0	0	0	1
	8				1			
0001 hex	0	0	1	0	0	0	0	0
	2				0			
0002 hex	0	0	0	0	0	0	0	0
	0				0			
0003 hex	0	0	0	1	0	1	0	1
	1				5			



Additional Information

The write protection setting area in the ID Tag is not write-protected.

4-5-2 Clearing Write Protection of the V680 Method

To temporarily clear write protection, e.g., to overwrite the write-protected data, set "0" to the leftmost bit of address 0000 hex in the ID Tag.

Additional Information

Application Precaution for Write Protection
Write protection is a dedicated function of the ID Sensor Unit. It will not be effective for Reader Writers from other companies.

4-5-3 Setting Write Protection Using the V600 Method

With the V600 Series, different write protection setting methods are used for EEPROM Data Carriers (V600-D23P□□) (without batteries) and SRAM Data Carriers (with batteries). When using V600 commands with the V680-series ID Sensor Unit, the data memory setting in the ID Sensor Unit and the type of ID Tags can be selected to enable using the previous write protection setting method.

- Using EEPROM ID Tags (V680-D1KP□□)
  V600 EEPROM Write Protection Method
- Using FRAM ID Tags (V680-D2K/8K/32KF□□)
  V600 SRAM Write Protection Method

Additional Information

The ID Sensor Unit will automatically switch between the V600 EEPROM write protection method and the V600 SRAM write protection method. No user setting is required.

V600 EEPROM Write Protection Method (The following information applies when the V600 write protection method is set and V680-D1KP□□ ID Tags are used.)

Write protection is set by writing the end address to be protected in address 0000 hex of the ID Tag. The area between address 0001 hex and the end address will be write-protected. The status of the most significant bit of address 0000 hex determines whether write protection is enabled.

Therefore, addresses 0080 to 03E7 hex cannot be set as the end address.

If the end address is set to 00 hex, however, all addresses from 0001 to 03E7 hex will be protected.

Memory Map of Write Protection Setting Area for V600 EEPROM Write Protection Method

Address/Bit	7	6	5	4	3	2	1	0
0000 hex	Enable/ Disable Bit	End address						

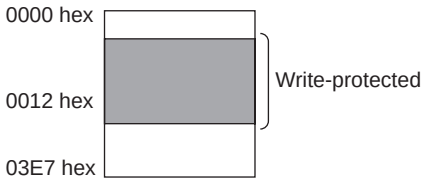
- Setting of MSB of Address 0000 Hex
  1: Write protection enabled
  0: Write protection disabled
- End Address Setting Range
  End address: 00 or 01 to 7F hex

Precautions for Correct Use

If write protection is enabled, write separately to the write protection setting area (address 0000 hex) and the rest of the ID Tag (addresses 0001 hex and higher). If the leftmost bit of address 0000 hex is 1 and you write both the write protection setting area (address 0000 hex) and following addresses at the same time, a protection error will occur.

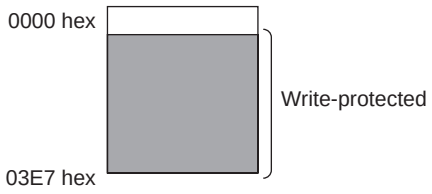
Write Protection Setting Examples
The following settings would write-protect addresses 0001 through 0012 hex:

Address/Bit	Upper digit				Lower digit			
0000 hex	1	0	0	1	0	0	1	0
	9				2			



End Address Set to 00 Hex
The entire memory except address 0000 hex is write-protected.

Address/Bit	Upper digit				Lower digit			
0000 hex	1	0	0	0	0	0	0	0
	8				0			



Additional Information

The write protection setting area in the ID Tag is not write-protected.

V600 SRAM Write Protection Method (The following information applies when the V600 write protection method is set and V680-D2K/8K/32KF□□ ID Tags are used.)

Write protection is set by writing the start address and the end address to be protected in addresses 0002 to 0005 hex of the ID Tag. The area between the start address and the end address will be write-protected. The status of the most significant bit of address 0002 hex determines whether write protection is enabled.

If the V600 SRAM write protection method is being used and write protection is enabled in the ID Sensor Unit, addresses 0000 and 0001 hex will always be write-protected (regardless of the write protection enable/disable setting in the ID Tag).

Memory Map of Write Protection Setting Area for V600 S-RAM Write Protection Method

Address/Bit	7	6	5	4	3	2	1	0
0002 hex	Enable/ Disable Bit	Upper two digits of start address (00 to 7F hex)						
0003 hex	Lower two digits of start address (00 to FF hex)							
0004 hex	Upper two digits of end address (00 to FF hex)							
0005 hex	Lower two digits of end address (00 to FF hex)							

- Setting of MSB of Address 0002 Hex
  1: Write protection enabled
  0: Write protection disabled
- Range in ID Tag for Which Write Protection Can Be Set
  Start address: 0006 to 7FFF hex
  End address: 0006 to FFFF hex

Precautions for Correct Use

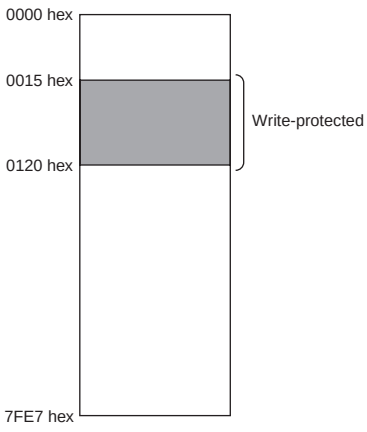
If write protection is enabled, write separately to the write protection setting area (addresses 0002 to 0005 hex) and the rest of the ID Tag (addresses 0006 hex and higher). If the leftmost bit of address 0002 hex is "1" and you write both the write protection setting area (addresses 0002 to 0005 hex) and following addresses at the same time, a protection error will occur.

● ID Tag Write Protection Setting Examples

Start Address Lower Than End Address

All addresses from the start address to the end address, inclusive, will be write-protected.

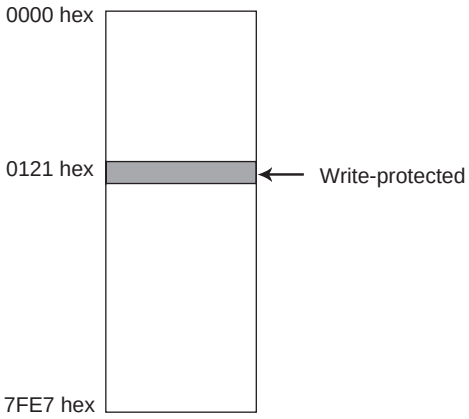
Address/Bit	Upper digit				Lower digit			
0002 hex	1	0	0	0	0	0	0	0
	8				0			
0003 hex	0	0	0	1	0	1	0	1
	1				5			
0004 hex	0	0	0	0	0	0	0	1
	0				1			
0005 hex	0	0	1	0	0	0	0	0
	2				0			



Start Address Equals End Address

Only the set address (1 byte) will be write-protected.

Address/Bit	Upper digit				Lower digit			
0002 hex	1	0	0	0	0	0	0	0
	8				0			
0003 hex	0	0	1	0	0	0	0	1
	2				1			
0004 hex	0	0	0	0	0	0	0	0
	0				0			
0005 hex	0	0	1	0	0	0	0	1
	2				1			



End Address Exceeds Last ID Tag Address

All addresses from the start address to the final address in the ID Tag, inclusive, will be write-protected.

Address/Bit	Upper digit				Lower digit			
0002 hex	1	0	0	0	0	0	1	1
	8				3			
0003 hex	0	0	0	0	0	0	0	0
	0				0			
0004 hex	1	1	1	1	1	1	1	1
	F				F			
0005 hex	1	1	1	1	1	1	1	1
	F				F			

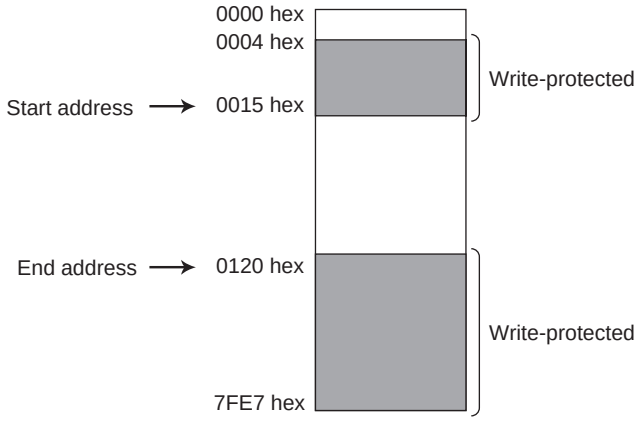
Additional Information

- The write protection setting area in the ID Tag is not write-protected.
- Addresses 0000 and 0001 hex will always be write-protected (regardless of the write protection enable/disable setting in the ID Tag).

Start Address Greater Than End Address

All addresses from the start address to the final address and all addresses from address 0006 hex to the end address in the ID Tag, inclusive, will be write-protected.

Address/Bit	Upper digit				Lower digit			
0002 hex	1	0	0	0	0	0	0	1
	8				1			
0003 hex	0	0	1	0	0	0	0	0
	2				0			
0004 hex	0	0	0	0	0	0	0	0
	0				0			
0005 hex	0	0	0	1	0	1	0	1
	1				5			



Additional Information

- The write protection setting area in the ID Tag is not write-protected.
- Addresses 0000 and 0001 hex will always be write-protected (regardless of the write protection enable/disable setting in the ID Tag).

4-5-4 Clearing Write Protection of V600 Method

To temporarily clear write protection, e.g., to overwrite the write-protected data, set "0" to the leftmost bit of the following address in the ID Tag.

- V600 EEPROM write protection method: 0000 hex
- V600 SRAM write protection method: 0002 hex

Additional Information

Application Precaution for Write Protection
Write protection is a dedicated function of the ID Sensor Unit. It will not be effective for Reader Writers from other companies.

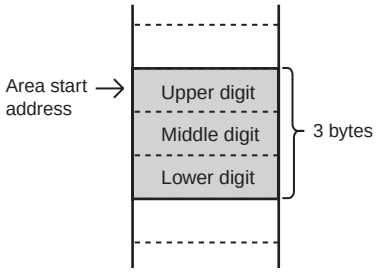
4-6 ID Tag Service Life Check (EEPROM type)

The Number of Writes Control command can be used to check whether the ID Tag write limit has been exceeded. This command checks if the write count for an ID Tag exceeds a preset value or a user-defined value.

There are two ways to manage the number of writes. One is to add the number of writes and then detect when the total exceeds the preset value. The other is to subtract from a user-specified number of writes and then detect whether the write count has been exceeded.
The preset value of ID tag writes is 100,000 for this function.
However, the number of writes specification depends on each ID tag and the value may not match the default value for some ID tags. To manage the number of writes for these ID tags, use the method in *Number of Writes Control 2*. For details on the number of writes specification for each tag, refer to the *Amplifier/Tags (EEPROM) User's Manual (Cat. No. Z262)*.

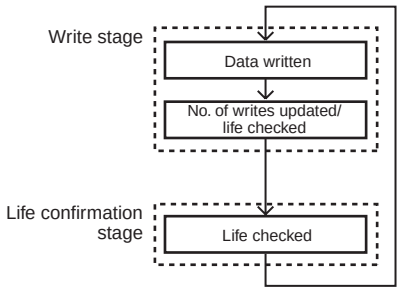
Number of Writes Control 1 (Life Control = Preset Number of Writes)

The Number of Writes Control Area consists of 3 bytes from the start address. The Number of Writes Control command is counted with an Add specification and the number is written to the control area. When the counted number exceeds 100,000 (0186A0 hex), the ID Tag Status (**_Ch1_IDTagSta*, **_Ch2_IDTagSta*) in the Results Information will turn ON. If the value in the control area already exceeds 100,000 writes, the value will not be changed.



- Application Method

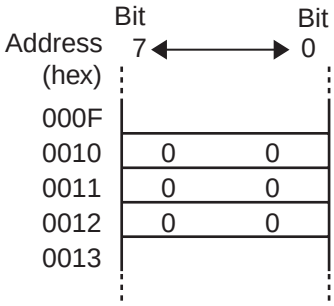
The life of the ID Tag can be managed by updating the number of writes after data is written to the block with the largest number of writes. (The life of EEPROM ID Tags is defined for each data block (8 bytes), so the number of writes must be counted for the block with the largest number of writes.) It is also possible to confirm the number of writes without updating number of writes.



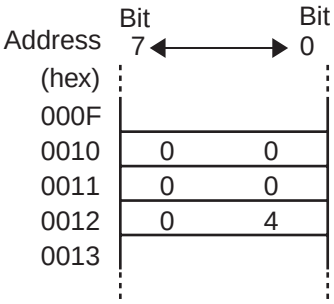
● Application Example

The following example uses 3 bytes starting at address 0010 (hex) as the number of writes control area.

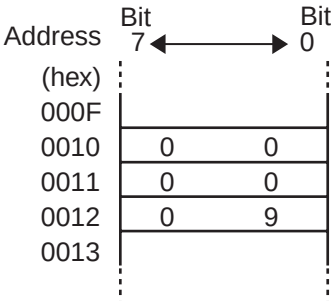
1 Execute a Write command to clear the control area.



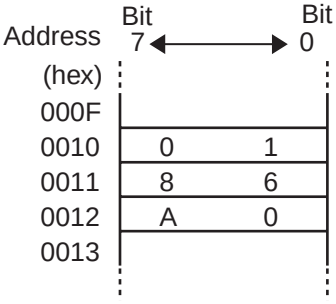
2 Set the number of writes to 4 and execute the Number of Writes Control command with an Add specification.



3 Set the number of writes to 5 and execute the Number of Writes Control command with an Add specification.



4 The following illustration shows memory status when the total number of writes has reached 100,000 writes.
At this time, the ID Tag Status (*_*Ch1_IDTagSta*, *_*Ch2_IDTagSta*) in the Results Information will turn ON.

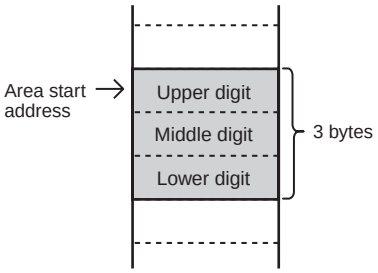


Precautions for Correct Use

For any one ID Tag, use either an Add specification or a Subtract specification for the Number of Writes Control command. If both specifications are used for the same ID Tag, it is not possible to manage the number of writes correctly.

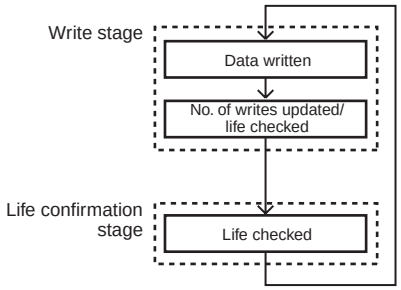
Number of Writes Control 2 (Life Control = User Setting)

The Number of Writes Control Area consists of 3 bytes from the start address. The Number of Writes Control command is counted with a Subtract specification. When the counted number is less than 0, the ID Tag Status (*_Ch1_IDTagSta, *_Ch2_IDTagSta) in the Results Information will turn ON. The specified number of writes is subtracted and the result is written to the control area. Therefore, write the maximum number of writes to the Control Area beforehand to enable control of the number of writes. Set the value for the number of ID tag writes specification to be used. The user-specified number of writes can be set to up to 16,700,000 in the Number of Writes Control Area. When the value in the control area is already 0, the value will not be updated.



- Application Method

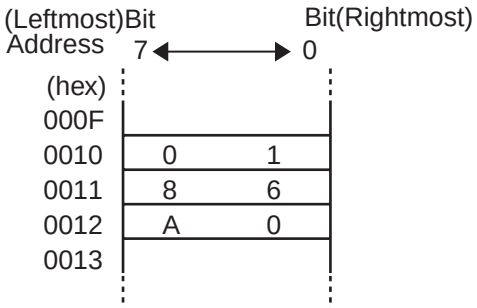
A user-specified number of writes can be used for life control by writing the desired value in the Number of Writes Control Area in advance.
The life of the ID Tag can be managed by updating the number of writes when data is written to the block with the largest number of writes. (The life of EEPROM ID Tags is defined for each data block (8 bytes), so the number of writes must be counted for the block with the largest number of writes.) It is also possible to confirm the number of writes without updating number of writes.



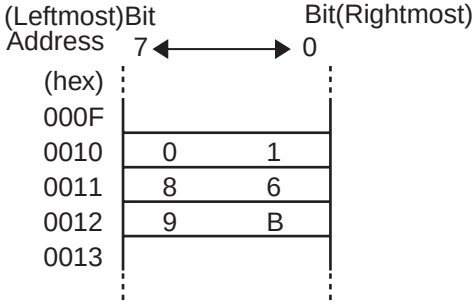
Application Example

The following example uses 3 bytes starting at address 0010 (hex) as the number of writes control area.

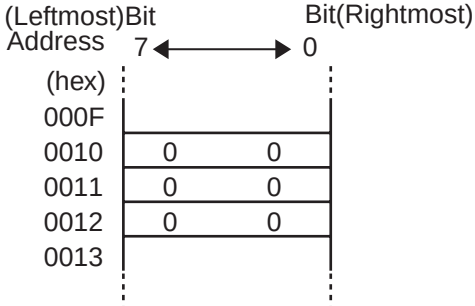
1 Execute a Write command to set the control area to 100,000 writes.



2 Set the number of writes to 5 and execute the Number of Writes Control command with a Subtract specification.



3 The following illustration shows memory status when the total number has reached 100,000 writes.
At this time, the ID Tag Status (*_*Ch1_IDTagSta*, *_*Ch2_IDTagSta*) in the Results Information will turn ON.



Precautions for Correct Use

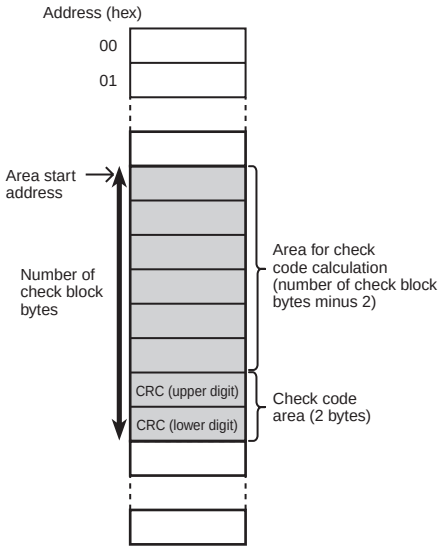
For any one ID Tag, use either an Add specification or a Subtract specification for the Number of Writes Control command. If both specifications are used for the same ID Tag, it is not possible to manage the number of writes correctly.

4-7 ID Tag Memory Check

The Memory Check command performs an ID Tag memory check. A CRC (Cyclic Redundancy Check) code calculation, write, and comparison are made using the check block unit specified by the user. The CRC code is calculated from the generated polynomial expression $X^{16} + X^{12} + X^5 + 1$.

A memory check is performed by using the Data Check command with a Calculation processing specification to write the check code and a Verification processing specification to verify the check code. The start address and the number of bytes determine the specified check block. All but the last 2 bytes are the area to calculate and the last 2 bytes are the check code area.

When the Data Check command is executed to write the check code, the CRC code is calculated for the area to calculate and written in the check code area.

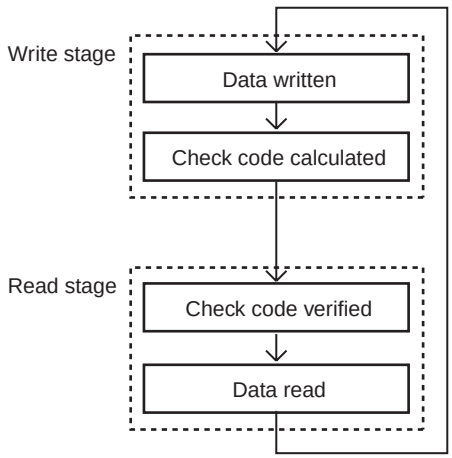


When the Data Check command is executed to verify the data, the CRC code is calculated for the area to calculate and compared with the data in the check code area. If the calculated code is the same as the data in the check code area, the Command Normal End (**_Ch1_NormEndSta, *_Ch2_NormEndSta*) in Unit Status will turn ON.

If they are not the same, the Command Error End (**_Ch1_ErrEndSta*, **_Ch2_ErrEndSta*) in Unit Status will turn ON, and the ID Tag Status (**_Ch1_IDTagSta*, **_Ch2_IDTagSta*) in the Results Information will turn ON as a warning.

- Application Method

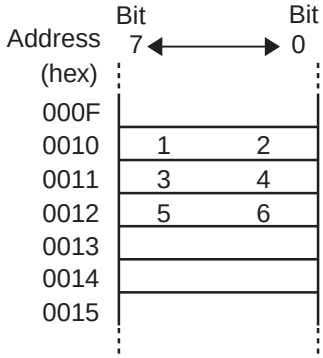
After writing the data, execute the Data Check command with a Calculation processing specification to calculate and write the check code. Before reading the data, execute the Data Check command with a Verification processing specification to verify the check code. This enables detecting internal data corruption that might occur in the ID Tag when the data is not being accessed.



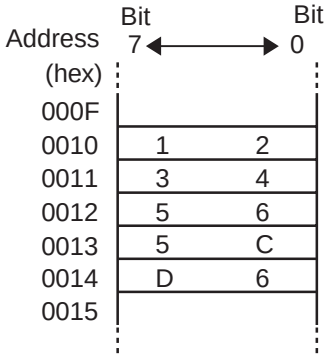
● Application Example

The following example checks the data in addresses 0010 to 0012 (hex).

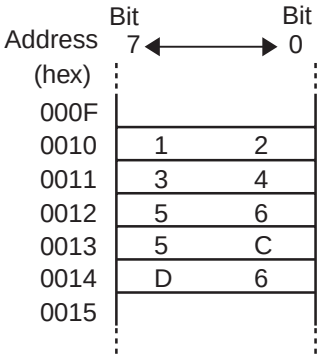
1 Assume that the following data is initially in memory.



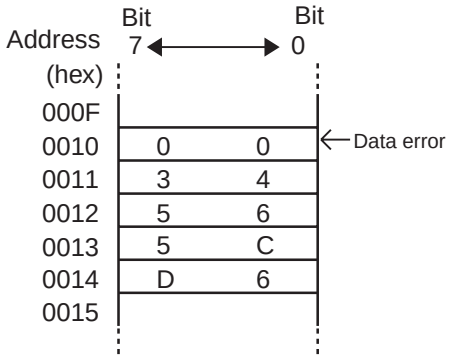
2 Execute the Data Check command to calculate the check code for 5 bytes beginning with address 0010 (hex). The CRC Code 5CD6 hex calculated from the data "123456" is written to addresses 0013 and 0014 (hex).



3 Execute the Data Check command to verify the data for 5 bytes beginning with address 0010 (hex). If the data matches, the Command Normal End in Unit Status (*_Ch1_NormEndSta*, *_Ch2_NormEndSta*) will turn ON.



If the data does not match, the Command Error End in Unit Status (*_Ch1_ErrEndSta, *_Ch2_ErrEndSta*) will turn ON.

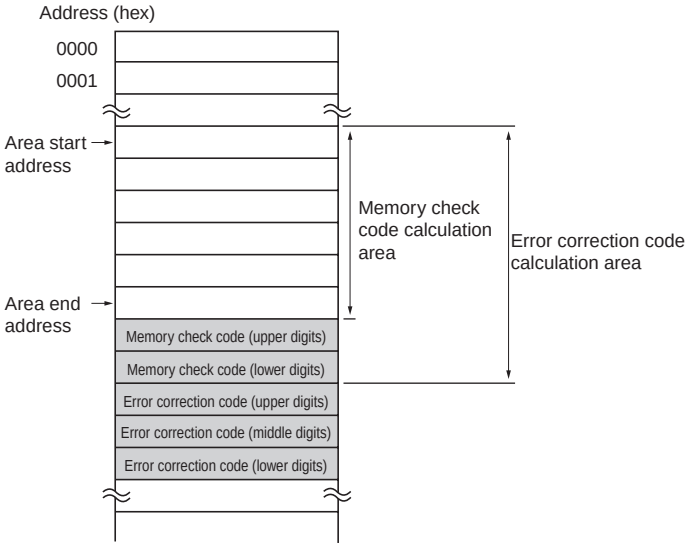


4-8 ID Tag Memory Error Correction

The Write with Error Correction command can be used to write an ID Tag memory check code and error correction code to the five bytes of memory after the write data. The Read with Error Correction command performs an ID tag memory check and makes 1-bit memory error corrections.

When a 1-bit memory error is corrected, the Error Correction (*_Ch1_ErrCorrection, *_Ch2_ErrCorrection*) in the Results Information will turn ON to warn that a 1-bit memory error occurred, and the normal data with the error corrected will be returned.

When a 2-bit or larger memory error is detected, the ID Tag Status (*_Ch1_IDTagSta*, *_Ch2_IDTagSta*) in the Results Information turns ON to warn that a fatal error occurred, and the read data will not be returned.



Example of ID Tag Memory Error Correction

When performing data check from address 16 (address 0010 hex) to address 21 (address 0015 hex)

1 Send the Write with Error Correction Command.

_Ch1_CmdSet =16#0B00 (Write with Error Correction, trigger, data storage order: Leftmost → Rightmost)

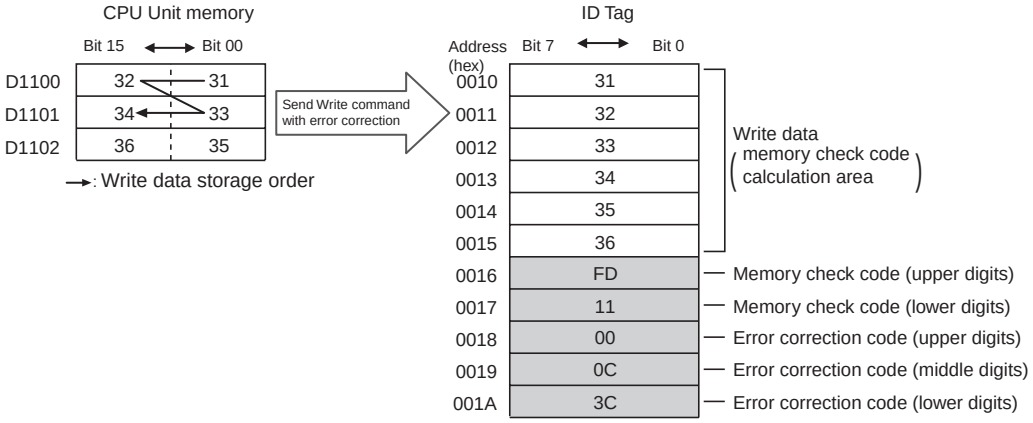
_Ch1_ProcAdr = 16 (Address 16)

_Ch1_ProcByte = 6 (6 bytes)

_Ch1_DatStorageSet =16#00001100 (Data Storage Area type: DM, Bank specification: None, Storage word address: 001100)

_Ch1_CmdOption = 0 (No option specification)

2 Data is written to addresses 0010 to 0015 (hex), then an ID Tag memory check code and a error correction code (5 bytes) are written to addresses 0016 to 001A (hex).



3 Send the Read with Error Correction command.

**_Ch1_CmdSet* = 16#0A00 (Read with Error Correction, trigger, data storage order: Leftmost → Rightmost)

**_Ch1_ProcAdr* = 16 (Address 16)

**_Ch1_ProcByte* = 6 (6 bytes)

**_Ch1_DatStorageSet* =16#00001100 (Data Storage Area type: DM, Bank specification: None, Storage word address: 001100)

**_Ch1_CmdOption* = 0 (No option specification)

- **If the read data is normal**

  **_Ch1_NormEndSta* = 1.

- **If a 1-bit memory error is corrected**

  **_Ch1_ErrEndSta* = 1, *_Ch1_ErrCorrection = 1.

- **If a memory error of 2 bits or more is detected**

  **_Ch1_ErrEndSta* = 1, *_Ch1_IDTagSta = 1.

5

Controlling the ID Sensor Unit

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- 5-1-3 Commands Used to Write Data (Cyclic Data Transfer for Write, Bit Set, Bit Clear, Mask Bit Write, Calculation Write, Data Fill, Data Check, Number of Writes Control, and Write with Error Correction) 5-4
- 5-1-4 Copy Command 5-5
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- 5-2-1 Commands 5-7
- 5-2-2 Command Descriptions 5-8

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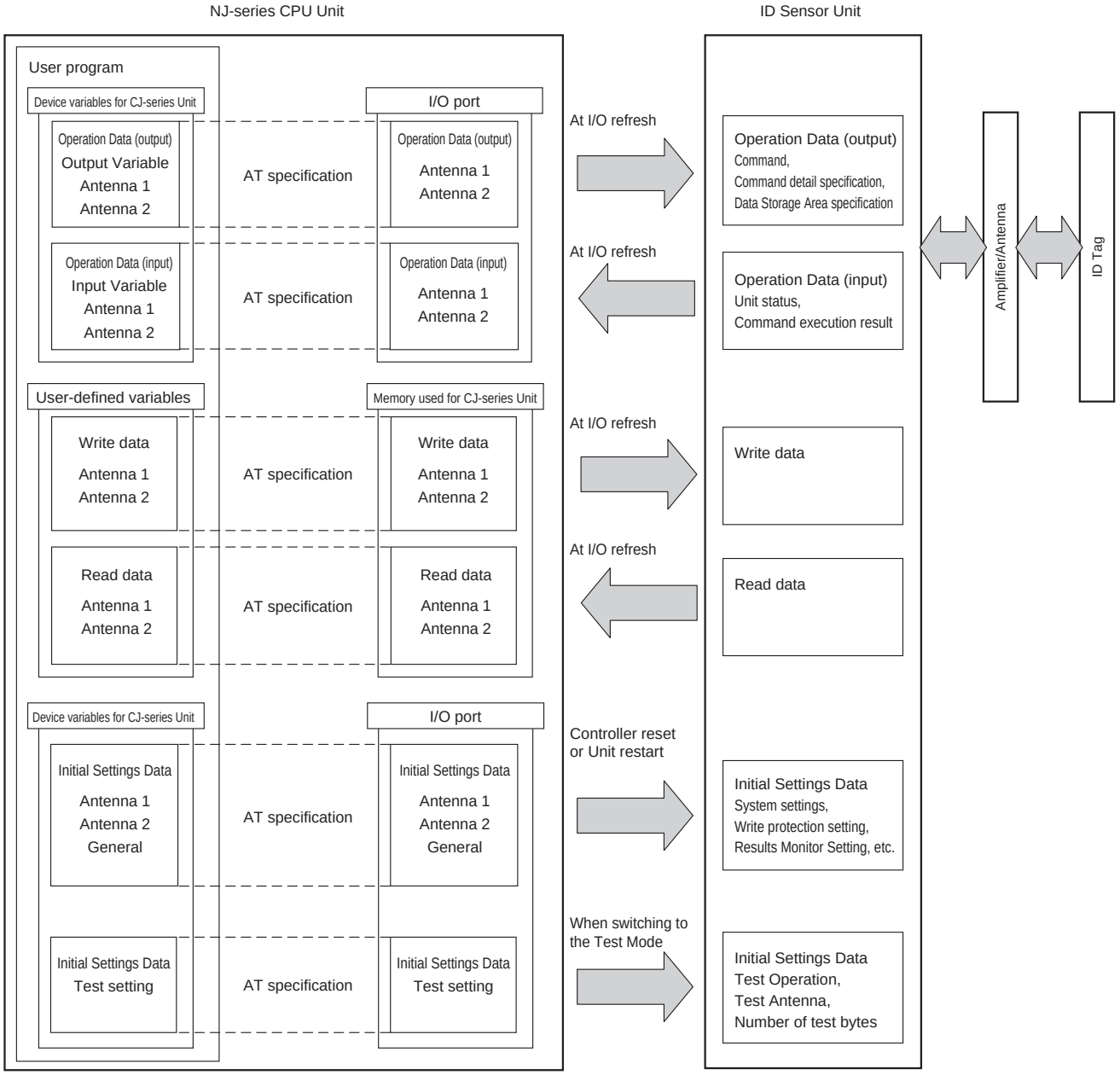
5-1 ID Sensor Unit Operation

The user program in the NJ-series CPU Unit is used to operate the ID Sensor Unit.

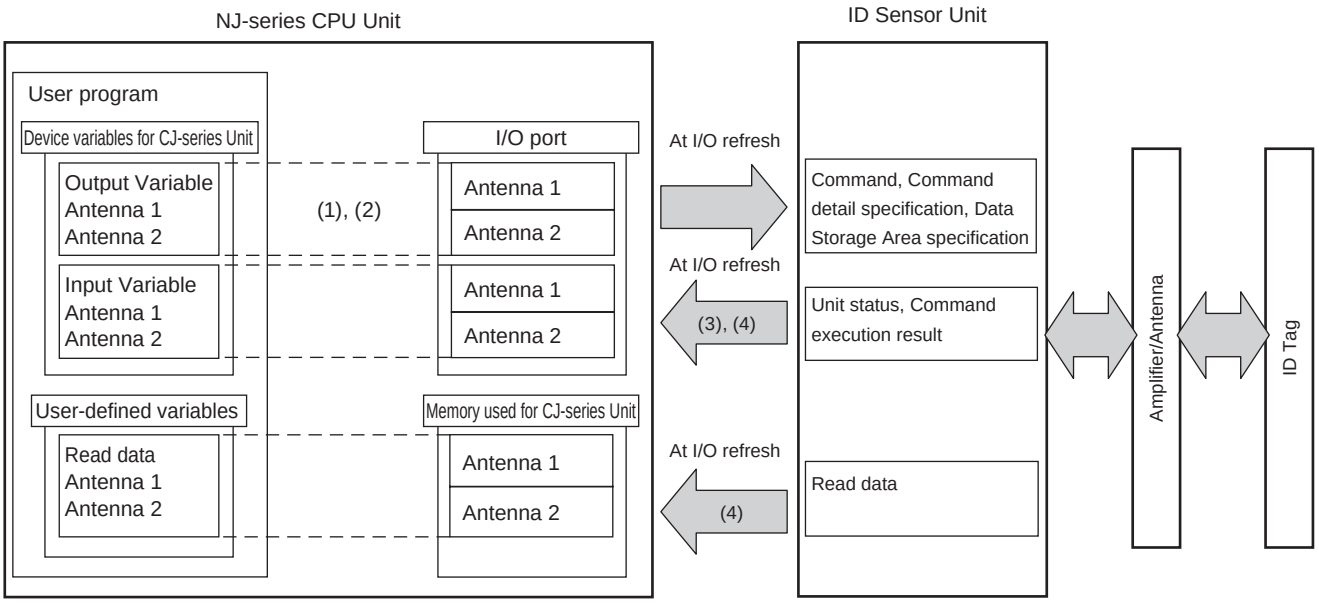
5-1-1 Outline of Operation



Additional Information

- The ID Sensor Unit will complete execution of any command that is being executed even if the CPU Unit is changed to PROGRAM Mode.
- If an ID Sensor Unit error occurs, communications will stop regardless of the operating mode.

5-1-2 Commands Used to Read Data (Cyclic Data Transfer for Read, Read with Error Correction, and UID Read)



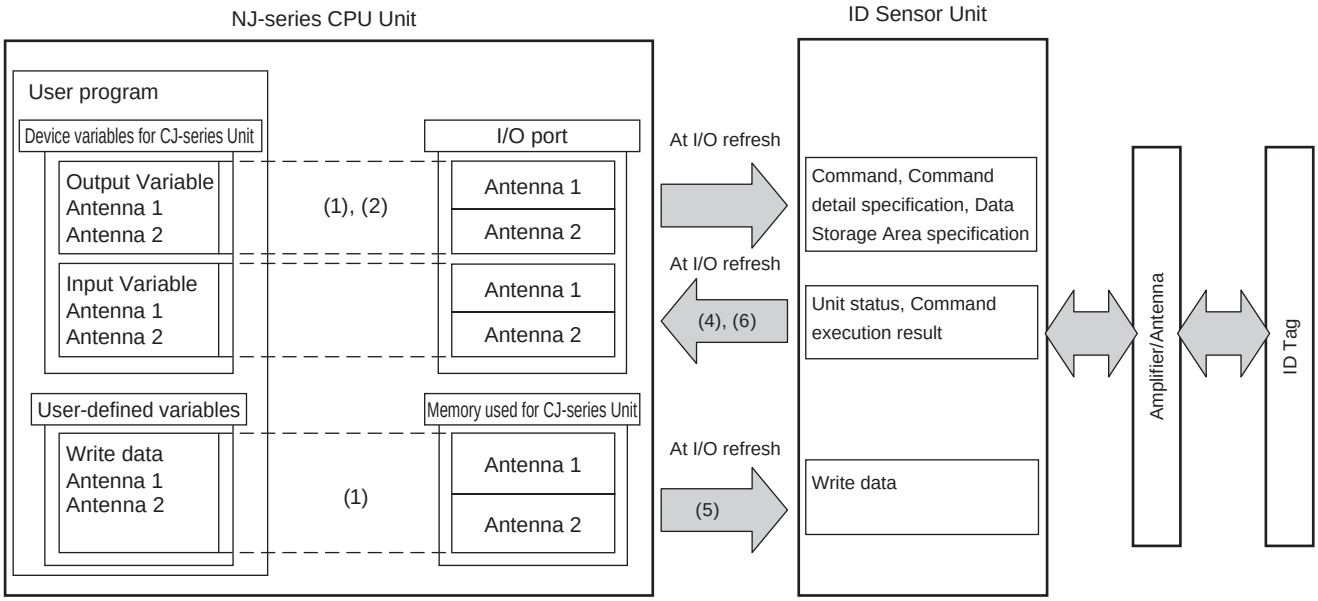
1) With the user program, set the Processing Address, Number of Processing Bytes, Data Storage Area and other settings that relate to reading of ID Tag data in the applicable output variables in device variables for CJ-series Unit.
2) With the user program, set the Command Execution Bit (*_*Ch#_ExecCmd*) to 1.
3) The ID Sensor Unit sets the ID Busy (*_*Ch#_IDBusySta*) to 1 once the Command Execution Bit (*_*Ch#_ExecCmd*) becomes 1.
4) After all ID Tag data is read, the ID Sensor Unit transfers the Results Information and processing results monitor information to the applicable input variables in device variables for CJ-series Unit via the memory used for CJ-series Unit. The Unit also transfers the read data of ID Tags to the read data of user-defined variables via the memory used for CJ-series Unit.
   Thereafter, the ID Busy (*_*Ch#_IDBusySta*) changes to 0 and the Command Normal End (*_*Ch#_NormEndSta*) is set to 1 for one task period.
5) Use the following data in the user program after the Normal End Flag (*_*Ch#_NormEndSta*) becomes 1: Results Information, processing results monitor information, and Data Storage Area settings which are stored in the respective device variables for CJ-series Unit.

   Note that the Results Information will be retained until the Error Reset Bit (*_*Ch#_ErrRst*) becomes 1 or until the next communications command is received.

Additional Information

Data transfer to the Data Storage Area is performed at 160 bytes/task period.

5-1-3 Commands Used to Write Data (Cyclic Data Transfer for Write, Bit Set, Bit Clear, Mask Bit Write, Calculation Write, Data Fill, Data Check, Number of Writes Control, and Write with Error Correction)



1) With the user program, set write data in user-defined variables.
2) With the user program, set the Processing Address, Number of Processing Bytes, Data Storage Area and other settings that relate to reading of ID Tag data in the applicable output variables in device variables for CJ-series Unit.
3) With the user program, set the Command Execution Bit (*_*Ch#_ExecCmd*) to 1.
4) The ID Sensor Unit sets the ID Busy (*_*Ch#_IDBusySta*) to 1 once the Command Execution Bit (*_*Ch#_ExecCmd*) becomes 1.
5) After the write data in the Data Storage Area is transferred to the ID Sensor Unit, data is written to the ID Tag.
6) After all ID Tag data is written, this Unit transfers the Results Information and processing results monitor information to the applicable input variables in device variables for CJ-series Unit via the memory used for CJ-series Unit. Thereafter, the ID Busy *(*_*Ch#_IDBusySta*) changes to 0 and the Command Normal End (*_*Ch#_NormEndSta*) is set to 1 for one task period.

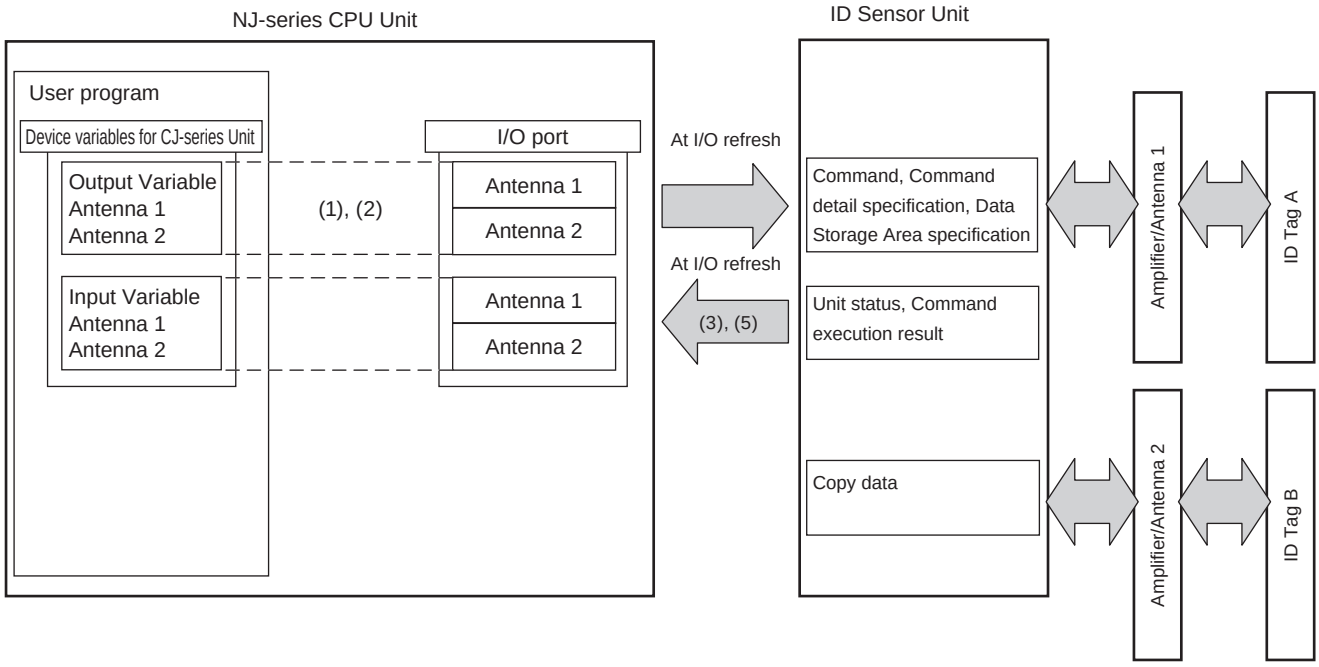
   Note that the Results Information will be retained until the Error Reset Bit (*_*Ch#_ErrRst*) becomes 1 or until the next communications command is received.

Additional Information

Data transfer to the Data Storage Area is performed at 160 bytes/task period.

5-1-4 Copy Command

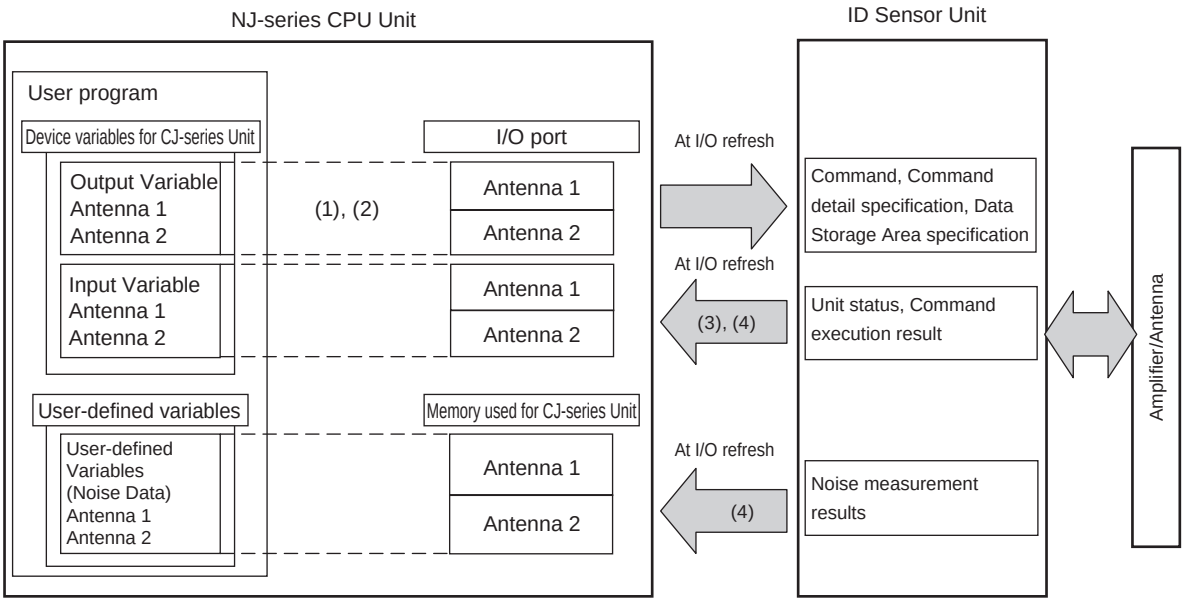
The figure below shows an example of writing the data from ID Tag A for Antenna 1 (Head 1) to the ID Tag B for Antenna 2 (Head 2).



1) With the user program, set the Processing Address, Number of Processing Bytes, Data Storage Area and other settings that relate to copying of ID Tag data in the applicable output variables in device variables for CJ-series Unit.
2) With the user program, set the Command Execution Bit (*_*Ch1_ExecCmd*) to 1.
3) The ID Sensor Unit sets the ID Busy (*_*Ch1_IDBusySta*) to 1 once the Command Execution Bit (*_*Ch1_ExecCmd*) becomes 1.
4) The ID Sensor Unit reads data from ID Tag A and writes the data to ID Tag B.
5) After all ID Tag data is written to ID Tag B, this Unit transfers the Results Information and processing results monitor information to the applicable input variables in device variables for *_CJ-series Unit via the memory used for CJ-series Unit. Thereafter, the ID Busy (*_*Ch1_IDBusySta*) changes to 0 and the Command Normal End (*_*Ch1_NormEndSta*) is set to 1 for one task period.

Note that the Results Information will be retained until the Error Reset Bit (*_*Ch1_ErrRst*) becomes 1 or until the next communications command is received.

5-1-5 Noise Measurement Command



1) With the user program, set the noise measurement results such as settings in the Storage Area to the applicable Output Variables in device variables for CJ-series Unit.
2) With the user program, set the Command Execution Bit (*_*Ch#_ExecCmd*) to 1.
3) The ID Sensor Unit sets the ID Busy (*_*Ch#_IDBusySta*) to 1 once the Command Execution Bit (*_*Ch#_ExecCmd*) becomes 1.
4) The ID Sensor Unit measures noise around the Antenna and transfers the Results Information and processing results monitor information to the input variables in device variables for CJ-series Unit via the memory used for CJ-series Unit. The Unit also transfers the noise measurement results to the noise data in user-defined variables via the memory used for CJ-series Unit. Thereafter, the ID Busy (*_*Ch#_IDBusySta*) changes to 0 and the Normal End Flag (*_*Ch#_NormEndSta*) is set to 1 for one task period.
5) Use the Results Information, processing results monitor information and noise measurement results which are stored in the respective device variables for CJ-series Unit, in the user program after the Normal End Flag (*_*Ch#_NormEndSta*) becomes 1.

5-2 Communications Commands

5-2-1 Commands

Command name	Command code	Function
Read	00	Reads data from the ID Tag's memory.
Write	01	Writes data to the ID Tag's memory.
Bit Set	02	Sets the specified bits of the specified area in the ID Tag.
Bit Clear	03	Clears the specified bits of the specified area in the ID Tag.
Mask Bit Write	04	Masks the specified bits in the specified area of the ID Tag and writes data to the bits that are not masked.
Calculation Write	05	Writes the calculation result between memory data and the specified data to the ID Tag.
Data Fill	06	Writes the specified data to the specified area of the ID Tag.
Data Check	07	Calculates and verifies check codes for ID Tag memory.
Number of Writes Control	08	Controls the number of ID Tag writes.
Copy	09	Writes the data read from an ID Tag by one Antenna to the ID Tag for the other Antenna. This command is supported by Two-channels ID Sensor Units only.
Read with Error Correction	0A	Reads data from the ID Tag's memory. Also uses a memory check code to check data reliability.
Write with Error Correction	0B	Writes data to the ID Tag's memory. Also writes the memory check code for the data reliability checking to the memory of the Tag.
UID Read	0C	Reads the ID Tag's ID code.
Noise Measurement	10	Measures the noise and returns the noise level as the measurement result.

Additional Information

- The Data Fill command will write data to the user area in the ID Tag regardless of the setting of write protection
- If there is an error in the command or option specifications, the Command Error (*_*Ch1_CmdErr*, *_*Ch2_CmdErr*) in the Results Information will turn ON and the command will not be executed.

5-2-2 Command Descriptions

Read

Reads the specified number of bytes from the specified start address in the ID Tag.

Up to 2,048 bytes (i.e., 1,024 words) can be read with one command execution.

Variable names		Bit No.	Name	Function	Description	
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)					
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command Code	00 hex	
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag.	
					0	Trigger
					1	Single Auto
					2	Repeat Auto
					3	FIFO trigger
					4	FIFO repeat
					5	Multi-access trigger
					6	Multi-access repeat
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the read data storage order. When using a byte array, set to "1: Rightmost → Leftmost".	
					0	Leftmost → Rightmost
					1	Rightmost → Leftmost
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the first ID Tag address to read, Setting range: 0 to 65535 (0000 hex to FFFF hex)	
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Specify the number of ID Tag read bytes. Setting range: 1 to 2048 (0001 hex to 0800 hex)	
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the read data storage destination. Refer to *Designating Data Storage Areas*.	
		24 to 27		0 to 65535 (0000 hex to FFFF hex)		
		00 to 23		Data storage area address		
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Not used	

Precautions for Correct Use

Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tags for which communications are being performed, the ID Tag Address Error (**_Ch1_IDTagAdrErr*, **_Ch2_IDTagAdrErr*) will turn ON.

Write

Writes the specified number of bytes of data beginning at the specified start address in the ID Tag.

Up to 2,048 bytes (i.e., 1,024 words) can be written with one command execution.

Variable names		Bit No.	Name	Function	Description	
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)					
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	01 hex	
		04 t 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag.	
					0	Trigger
					1	Single auto
					2	Repeat auto
					3	FIFO trigger
					4	FIFO repeat
					5	Multi-access trigger
					6	Multi-access repeat
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the write data storage order. When using a byte array, set to "1: Rightmost → Leftmost".	
					0	Leftmost → Rightmost
					1	Rightmost → Leftmost
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the first ID Tag address to write. Setting range: 0 to 65535 (0000 hex to FFFF hex)	
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Specify number of ID Tag write bytes Setting range: 1 to 2048 (0001 hex to 0800 hex)	
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the write data storage destination. Refer to *Designating Data Storage Areas* on page 3-17.	
		24 to 27		Bank Specification		
		00 to 23		Data storage area address		
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Not used.	

Precautions for Correct Use

Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tags for which communications are being performed, the ID Tag Address Error (**_Ch1_IDTagAdrErr*, **_Ch2_IDTagAdrErr*) will turn ON.

Additional Information

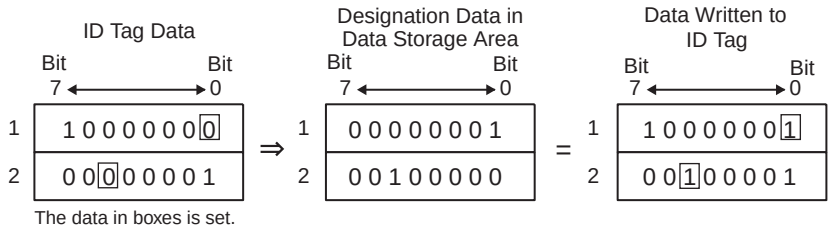
Verification will not be performed if No Verification is set for writing.

Bit Set

Reads the specified number of bytes from the specified start address and sets the specified bits to 1. For the designation data, use hexadecimal data in which corresponding bits to be set to 1 are turned ON.

Up to 4 bytes (i.e., 2 words) can be specified for one command execution.

The following example shows specifying 0120 hex for 2 bytes of data to set bit 0 in byte 1 and bit 5 in byte 2.



Variable names		Bit No.	Name	Function	Description	
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)					
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command	02 hex	
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag.	
					0	Trigger
					1	Single auto
					2	Repeat auto
					3	FIFO trigger
					4	FIFO repeat
					5	Multi-access trigger
					6	Multi-access repeat
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the storage order for the Designation Data. When using a byte array, set to "1: Rightmost → Leftmost".	
					0	Leftmost → Rightmost
					1	Rightmost → Leftmost
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the first ID Tag address to write. Setting range: 0 to 65535 (0000 hex to FFFF hex)	
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Specify number of ID Tag bytes to write. Setting range: 1 to 4 (0001 hex to 0004 hex)	
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the write data storage destination. Refer to *Designating Data Storage Areas* on page 3-17.	
		24 to 27		Bank Specification		
		00 to 23		Data storage area address		
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Not used	

Precautions for Correct Use

Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tag for which communications are being performed, the ID Tag Address Error (**_Ch1_IDTagAdrErr*, **_Ch2_IDTagAdrErr*) will turn ON.

Additional Information

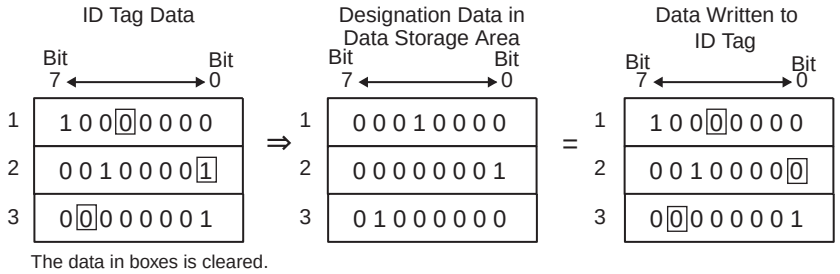
- Data status will not be changed for any bit that is OFF in the designation data.
- Verification will not be performed if No Verification is set for writing.

Bit Clear

Reads the specified number of bytes from the specified start address and clears the specified bits to 0. For the designation data, use hexadecimal data in which corresponding bits to be cleared to 0 are turned ON.

Up to 4 bytes (i.e., 2 words) can be specified for one command execution.

The following example shows specifying 100140 hex for 3 bytes of data to clear bit 4 in byte 1, bit 0 in byte 2, and bit 6 in byte 3.



The data in boxes is cleared.

Variable names		Bit No.	Name	Function	Description
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	**CJ1W-V680C12 Antenna 2 (Head 2)**				
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	03 hex
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag. 0: Trigger 1: Single auto 2: Repeat auto 3: FIFO trigger 4: FIFO repeat 5: Multi-access trigger 6: Multi-access repeat
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the storage order for the Designation Data. When using a byte array, set to "1: Rightmost → Leftmost". 0: Leftmost → Rightmost 1: Rightmost → Leftmost
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the first ID Tag address to write. Setting range: 0 to 65535 (0000 hex to FFFF hex)
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Specify number of ID Tag bytes to write. Setting range: 1 to 4 (0001 hex to 0004 hex)
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the write data storage destination. Refer to *Designating Data Storage Areas* on page 3-17.
		24 to 27		Bank Specification	
		00 to 23		Data storage area address	
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Not used

Precautions for Correct Use

Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tag for which communications are being performed, the ID Tag Address Error (**_Ch1_IDTagAdrErr, *_Ch2_IDTagAdrErr*) will turn ON.

Additional Information

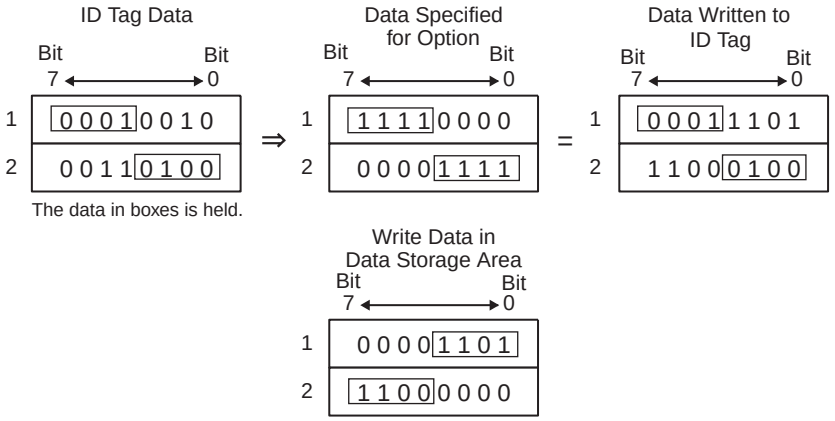
- Data status will not be changed for any bit that is OFF in the designation data.
- Verification will not be performed if No Verification is set for writing.

Mask Bit Write

Reads the 2 bytes of data from the specified start address, masks it with the specified mask data, and writes data to the bits that are not masked. For the mask data, set a hexadecimal value with the bits turned ON to mask them.

Each command execution processes 2 bytes (i.e., 1 word).

Example for a Masked Bit Write



Variable names		Bit No.	Name	Function	Description
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)				
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	04 hex
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag. 0: Trigger 1: Single auto 2: Repeat auto 3: FIFO trigger 4: FIFO repeat 5: Multi-access trigger 6: Multi-access repeat
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the write data storage order. When using a byte array, set to "1: Rightmost → Leftmost". 0: Leftmost → Rightmost 1: Rightmost → Leftmost
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the first ID Tag address to write. Setting range: 0 to 65534 (0000 hex to FFFE hex)
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Not used
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the write data storage destination. Refer to *Designating Data Storage Areas* on page 3-17.
		24 to 27		Bank Specification	
		00 to 23		Data storage area address	
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Specify the mask data. Setting range: 0 to 65534 (0000 hex to FFFE hex)

Precautions for Correct Use

Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tag for which communications are being performed, the ID Tag Address Error (**_Ch1_IDTagAdrErr, *_Ch2_IDTagAdrErr*) will turn ON.

Additional Information

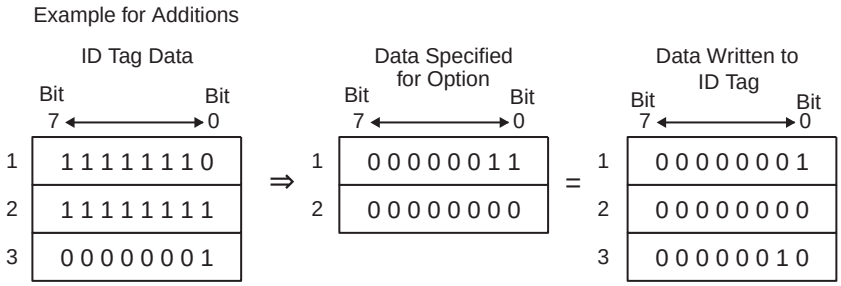
- The bits that are turned ON in the data set for the Command Option will be masked and will not be changed. Write data will be written to the Data Storage Area for bits that are OFF in the write data.
- Verification will not be performed if No Verification is set for writing.
- The mask data is always specified leftmost to rightmost regardless of the processing specification.

Calculation Write

Reads the specified number of bytes from the specified start address, performs the specified calculation with the data specified, and writes the result.

The calculation result is stored in the Data Storage Area.

Up to 4 bytes (i.e., 2 words) can be specified for one command execution.



Variable names		Bit No.	Name	Function	Description	
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)					
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	05 hex	
		07 to 04		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag.	
					0	Trigger
					1	Single auto
					2	Repeat auto
					3	FIFO trigger
					4	FIFO repeat
					5	Multi-access trigger
					6	Multi-access repeat
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the calculation method.	
					0	Add
					1	Subtract
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the first ID Tag address to write. Setting range: 0 to 65535 (0000 hex to FFFF hex)	
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Specify number of ID Tag write bytes. Setting range: 1 to 4 (0001 hex to 0004 hex)	
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the calculation result storage area. Refer to *Designating Data Storage Areas* on page 3-17.	
		24 to 27		Bank Specification		
		00 to 23		Data storage area address		
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Calculation data	

Precautions for Correct Use

Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tag for which communications are being performed, the ID Tag Address Error (**_Ch1_IDTagAdrErr, *_Ch2_IDTagAdrErr*) will turn ON.

Additional Information

- If an addition results in an overflow or a subtraction results in an underflow, the ID Tag Status (*_Ch1_IDTagSta, *_Ch2_IDTagSta*) will turn ON and the number of writes data will not be changed.
- Verification will not be performed if No Verification is set for writing.

Data Fill

Writes the designated fill data to the ID Tag beginning from the specified start address.

The maximum amount of data that can be written in a single execution is 2,048 bytes (1,024 words), or to the entire remaining area after the specified start address.

Variable names		Bit No.	Name	Function	Description	
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)					
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	06 hex	
		04 o 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag.	
					0	Trigger
					1	Single auto
					2	Repeat auto
					3	FIFO trigger
					4	FIFO repeat
					5	Multi-access trigger
					6	Multi-access repeat
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the fill data size.	
					0	Bytes (Command option rightmost 8 bits)
					1	Words
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the first ID Tag address to write. Setting range: 0 to 65535 (0000 hex to FFFF hex)	
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Specify number of ID Tag write bytes Setting range: 0, 1 to 4 (0000 hex, 0001 hex to 0004 hex) 0000 hex: Fill data is written to the ID Tag's end address.	
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Not used	
		24 to 27		Bank Specification		
		00 to 23		Data storage area address		
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Fill data Setting range: 0 to 65535 (0000 hex to FFFF hex)	

Precautions for Correct Use

Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tag for which communications are being performed, ID Tag Address Error (**_Ch1_IDTagAdrErr, *_Ch2_IDTagAdrErr*) will turn ON.

Additional Information

- If the Number of Processing Bytes is 0000 hex, data will be written to user area of the ID Tag from the start address to the end address.
- The Data Fill command will write data to the user area in the ID Tag regardless of the setting of write protection.
- Verification will not be performed if No Verification is set for writing.

Data Check

Finds the CRC code for the data area from the specified start address to 2 bytes less than the specified number of bytes and writes 2 bytes of data.

From 3 to 2,048 bytes of data can be specified for one command execution.

Variable names		Bit No.	Name	Function	Description
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)				
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	07 hex
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag. 0: Trigger 1: Single auto
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the process. 0: CRC calculation 1: CRC verification
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the Data Check Start address in the ID Tag. Setting range: 0 to 65535 (0000 hex to FFFF hex)
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Specify the number of bytes in the data check range in the ID Tag plus 2 bytes. Setting range: 3 to 2048 (0003 hex to 0800 hex)
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	No used
		24 to 27		Bank Specification	
		00 to 23		Data storage area address	
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	No used

Precautions for Correct Use

- The last 2 bytes of the check area is the check code area. Do not write user data to these bytes.
- Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tag for which communications are being performed, ID Tag Address Error (**_Ch1_IDTagAdrErr, *_Ch2_IDTagAdrErr*) will turn ON.

Additional Information

Verification will not be performed if No Verification is set for writing.

Number of Writes Control

Uses 3 bytes of data from the specified start address as the Number of Writes Control Area and writes data to the ID Tag.

The number of writes to be updated with one command execution is from 0 to 255.

Variable names		Bit No.	Name	Function	Description	
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)					
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	08 hex	
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag.	
					0	Trigger
					1	Single auto
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the count update method.	
					0	Add
					1	Subtract
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the start address of the Number of Writes Control Area in the ID Tag. Setting range: 0 to 65533 (0000 hex to FFFD hex)	
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Not used	
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the count update results storage area. Refer to *Designating Data Storage Areas* on page 3-17.	
		24 to 27		Bank Specification		
		00 to 23		Data storage area address		
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Number of writes Setting range: 0 to 255 (0000 hex to 00FF hex)	

Precautions for Correct Use

Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tag for which communications are being performed, the ID Tag Address Error (**_Ch1_IDTagAdrErr, *_Ch2_IDTagAdrErr*) will turn ON.

Additional Information

Verification will not be performed if No Verification is set for writing.

Copy (Two-channels ID Sensor Units Only)

This command is supported by Two-channels ID Sensor Units only. Data read from the ID Tag by one Antenna can be written to the memory of an ID Tag in the communications area of the other Antenna.

Writing to the second ID Tag is always performed with a trigger

Variable names		Bit No.	Name	Function	Description
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)				
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	09 hex
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method for the ID Tag to be read. 0: Trigger 1: Single auto
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Not used
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the first ID Tag address to read. Setting range: 0 to 65535 (0000 hex to FFFF hex)
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Specify the number of ID Tag read bytes Setting range: 1 to 2048 (0001 hex to 0800 hex)
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Not used
		24 to 27		Bank Specification	
		00 to 23		Data storage area address	
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Specify the first ID Tag address to write. Setting range: 0 to 65535 (0000 hex to FFFF hex)

Precautions for Correct Use

- Confirm that the Antenna that writes data is not in communication before turning ON the Command Execution Bit. If the Antenna that writes data is in communication, the ID Tag Status (**_Ch1_IDTagSta, *_Ch2_IDTagSta*) will turn ON.
- Confirm the capacity of both the ID Tag to be read and the one to be written before this command is used. If the processing address and number of processing bytes that write data are not suitable for the ID Tag to be communicated with, the ID Tag Status (**_Ch1_IDTagSta, *_Ch2_IDTagSta*) will turn ON.

Additional Information

- If the Command Execution Bit is turned ON in the Unit Controls for Antenna 1, data will be read from the ID Tag for Antenna 1 and written to the ID Tag for Antenna 2.
- If the Command Execution Bit is turned ON in the Unit Controls for Antenna 2, data will be read from the ID Tag for Antenna 2 and written to the ID Tag for Antenna 1.
- The Communications Specification for the Antenna that writes data will always be a trigger regardless of the specified communications method.
- The ID Tag Status (**_Ch1_IDTagSta, *_Ch2_IDTagSta*) in the Results Information will turn ON if an error occurs in the Antenna that writes data.

Read with Error Correction

Reads the data from the ID Tag from an area written by the Write with Error Correction Command, and performs an error check and 1-bit error correction.

Up to 510 bytes (i.e., 255 words) can be read for one command execution.

Variable names		Bit No.	Name	Function	Description	
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)					
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	0A hex	
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag.	
					0	Trigger
					1	Single auto
					2	Repeat auto
					3	FIFO trigger
					4	FIFO repeat
					5	Multi-access trigger
					6	Multi-access repeat
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the read data storage order. When using a byte array, set to "1: Rightmost → Leftmost".	
					0	Leftmost → Rightmost
					1	Rightmost → Leftmost
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the first ID Tag address to read. Setting range: 0 to 65530 (0000 hex to FFFA hex)	
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Specify the number of from the ID tag read byte. Setting range: 1 to 510 (0001 hex to 01FE hex)	
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the read data storage destination. Refer to *Designating Data Storage Areas*.	
		24 to 27		Bank Specification		
		00 to 23		Data storage area address		
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	No used	

Precautions for Correct Use

- Be sure to read the same area that was by the Write with Error Correction Command.
- Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tag for which communications are being performed, the ID Tag Address Error (**_Ch1_IDTagAdrErr, *_Ch2_IDTagAdrErr*) will turn ON.
- The five bytes of data after the area extending from the Processing Address for the Number of Processing Bytes is the check code area. Do not write any user data to the check code area.

Write with Error Correction

Writes the designated data to the ID Tag beginning from the specified start address, and writes the ID Tag memory check code and error correction code to the next 5 bytes of memory. Do not change this code. It is required by the Read with Error Correction command.

Up to 510 bytes (i.e., 255 words) can be written for one command execution.

Variable names		Bit No.	Name	Function	Description	
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)					
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	0B hex	
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag.	
					0	Trigger
					1	Single auto
					2	Repeat auto
					3	FIFO trigger
					4	FIFO repeat
					5	Multi-access trigger
					6	Multi-access repeat
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the write data storage order. When using a byte array, set to "1: Rightmost → Leftmost".	
					0	Leftmost → Rightmost
					1	Rightmost → Leftmost
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Specify the first ID Tag address to write. Setting range: 0 to 65530 (0000 hex to FFFA hex)	
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	Specify the number of to the ID tag write byte. Setting range: 1 to 510 (0001 hex to 01FE hex)	
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the write data storage destination Refer to *Designating Data Storage Areas* on page 3-17.	
		24 to 27		Bank Specification		
		00 to 23		Data storage area address		
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Not used	

Precautions for Correct Use

- Verification will not be performed if No Verification is set for writing.
- Check the memory capacity of the ID Tag before setting the processing address and number of processing bytes. If the processing address and number of processing bytes are not suitable for the ID Tag for which communications are being performed, the ID Tag Address Error (**_Ch1_IDTagAdrErr, *_Ch2_IDTagAdrErr*) will turn ON.
- The five bytes of data after the area extending from the Processing Bytes is the check code area. Do not write any user data to the check code area.

UID Read

Reads the ID code from the ID Tag.

Variable names		Bit No.	Name	Function	Description	
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)					
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	0C hex	
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Specify the communications method with the ID Tag.	
					0	Trigger
					1	Single auto
					2	Repeat auto
					3	FIFO trigger
					4	FIFO repeat
					5	Multi-access trigger
					6	Multi-access repeat
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Specify the read data storage order. When using a byte array, set to "1: Rightmost → Leftmost".	
					0	Leftmost → Rightmost
					1	Rightmost → Leftmost
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	Not used	
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes		
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the read data storage destination. Refer to *Designating Data Storage Areas* on page 3-17.	
		24 to 27		Bank Specification		
		00 to 23		Data storage area address		
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Not used	

Noise Measurement

Checks the noise level when the command is received.

Variable names		Bit No.	Name	Function	Description
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (Head 1)	CJ1W-V680C12 Antenna 2 (Head 2)				
*_Ch1_CmdSet	*_Ch2_CmdSet	08 to 15	Command	Command code	10 hex
		04 to 07		Communications Specifications Refer to *4-2 Communications Specifications*.	Not used
		00 to 03		Processing Specifications Refer to *Designating Processing Specifications* on page 3-17.	Not used
*_Ch1_ProcAdr	*_Ch2_ProcAdr	-		Processing Address	
*_Ch1_ProcByte	*_Ch2_ProcByte	-		Number of Processing Bytes	
*_Ch1_DatStorageSet	*_Ch2_DatStorageSet	28 to 31	Data storage area	Data Storage Area	Specify the data storage destination. Refer to *Designating Data Storage Areas* on page 3-17.
		24 to 27		Bank Specification	
		00 to 23		Data storage area address	
*_Ch1_CmdOption	*_Ch2_CmdOption	-	Option	Command Option	Not used

5-3 Communications Time

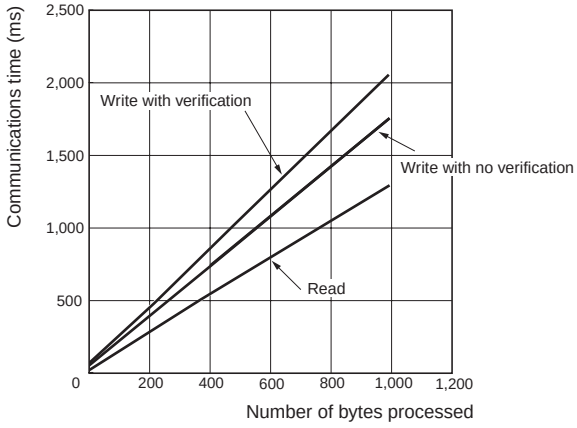
5-3-1 ID Tag Communications Time

Communications time based on the following combination:

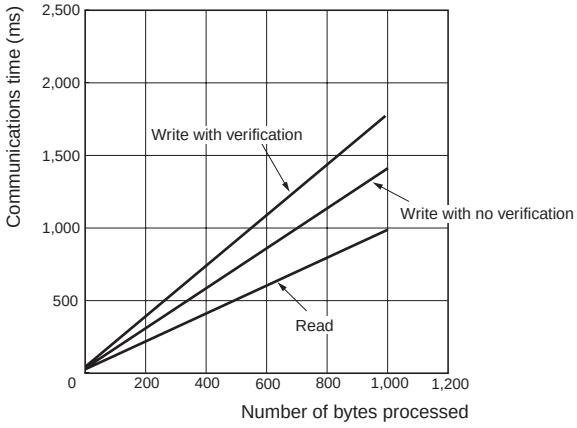
Amplifier	Antenna	ID Tag
V680-HA63A	V680-HS □□	V680-D1KP □□
V680-H01 / V680-H01-V2		V680-D1KP □□

ID Tag communications speed	Command	Communications time N: Number of processed bytes
Normal	Read	T = 1.3N + 31
	Write with verification	T = 2.1N + 58
	Write with no verification	T = 1.8N + 56
High-speed	Read	T = 1.0N + 29
	Write with verification	T = 1.8N + 51
	Write with no verification	T = 1.5N + 47

● Communications speed: Normal



● Communications speed: High-speed



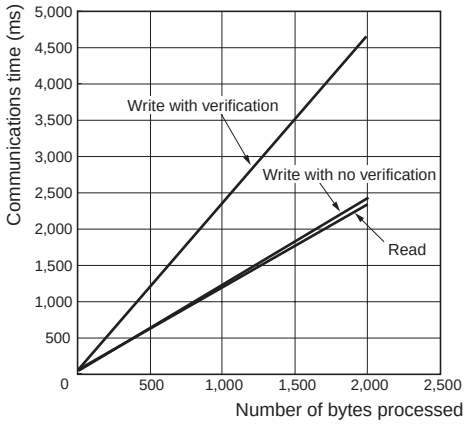
Communications time based on the following combination:

Amplifier	Antenna	ID Tag
V680-HA63B	V680-HS □□	V680-D2KF □□

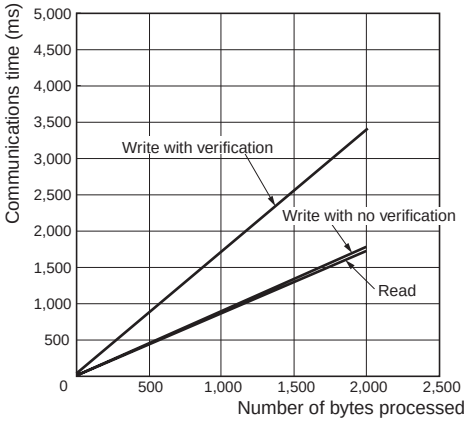
ID Tag communications speed	Command	Communications time N: Number of processed bytes
Normal	Read	T = 1.2N + 30
	Write with verification	T = 2.4N + 49
	Write with no verification	T = 1.2N + 49
High-speed*	Read	T = 0.9N + 27
	Write with verification	T = 1.7N + 49
	Write with no verification	T = 0.9N + 41

* When using a multi-access or FIFO communications specification, the Normal communications speed will be used even if the High-speed is set.

● Communications speed: Normal Mode



● Communications speed: High-speed Mode



Communications time based on the following combination:

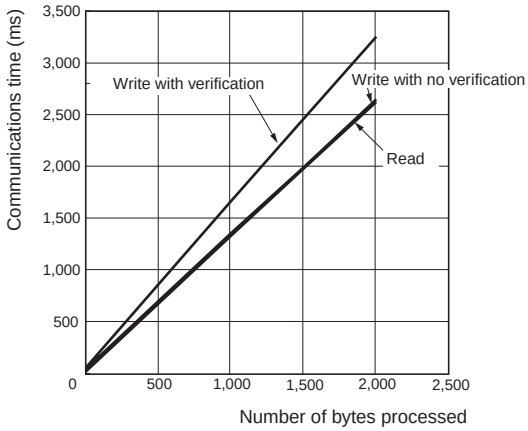
Amplifier	Antenna	ID Tag
V680-HA63B	V680-HS □□	V680-D8KF □□ V680-D32KF □□

V680-HA63B, V680-HS□□, V680-D8KF□□, and V680-D32KF□□

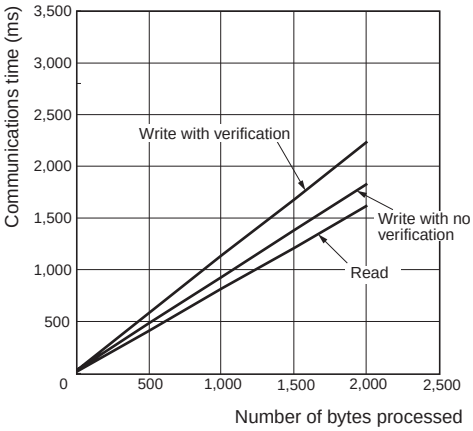
ID Tag communications speed	Command	Communications time N: Number of processed bytes
Normal Mode	Read	T = 1.3N + 30
	Write with verification	T = 1.6N + 59
	Write with no verification	T = 1.3N + 50
High-speed Mode*	Read	T = 0.8N + 25
	Write with verification	T = 1.1N + 41
	Write with no verification	T = 0.9N + 40

* When using a multi-access or FIFO communications specification, the Normal Mode communications speed will be used even if the High-speed Mode is set.

● Communications speed: Normal Mode



● Communications speed: High-speed Mode

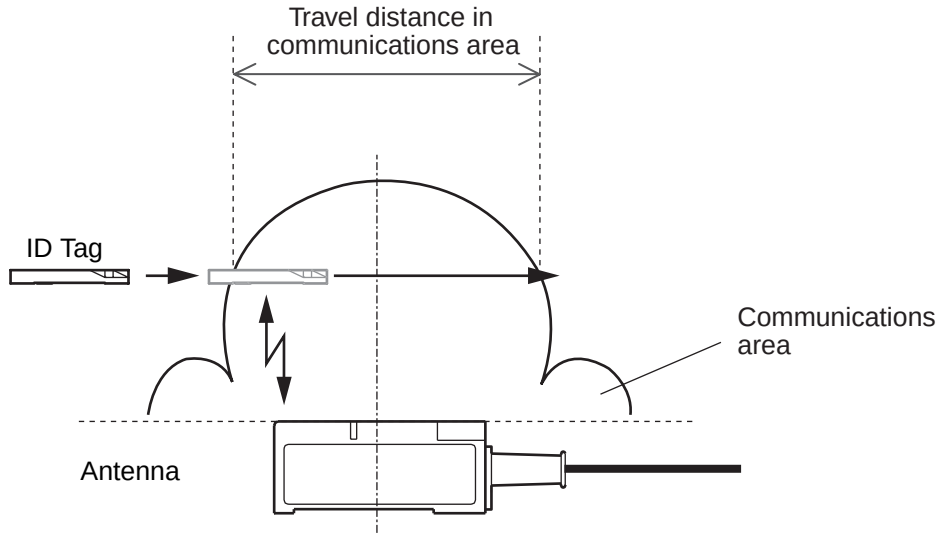


5-3-2 ID Tag Travel Speed

Use the following formula to calculate the travel speed of the ID Tag.

Travel speed = Travel distance in communications area/communications time

The communications time is given in the graphs on the previous page. The travel distance in the communications area depends on the Antenna and the ID Tag. Refer to the user manual for the Antenna and ID Tag.



Additional Information

- The travel speed will change with the communications distance and axis displacement. We recommend using the widest part of the area.
- Use the calculated value as reference data. Perform tests with the actual system before application.
- The value calculated with this formula does not include communications error processing time.

TAT Calculation

The following formula can be used to calculate the Turn Around Times (TAT) from when the CJ-series CPU Unit turns the ID Sensor Unit's Execution Bit ON until communication with the ID tag is achieved and results are returned.

TAT = Coefficient × Task period of CPU Unit + Communications time

Name	Description
Coefficient	(Number of Processing Bytes/160) + 3*
Task period of CPU Unit	Task period of the NJ-series CPU Unit
Communications time	The communications time between the ID Sensor Unit and ID Tag (as previously described)

* Round OFF the result of the Number of Processing Bytes/160.

6

Troubleshooting Alarms and Errors

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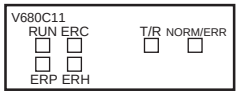
6-1 Indicators and Error Check Flowcharts

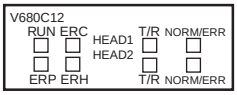
6-1-1 Status Indicators

If an alarm or error occurs in the ID Sensor Unit, the ERC indicator or ERH indicator will light on the Unit's front panel.

CJ1W-V680C11



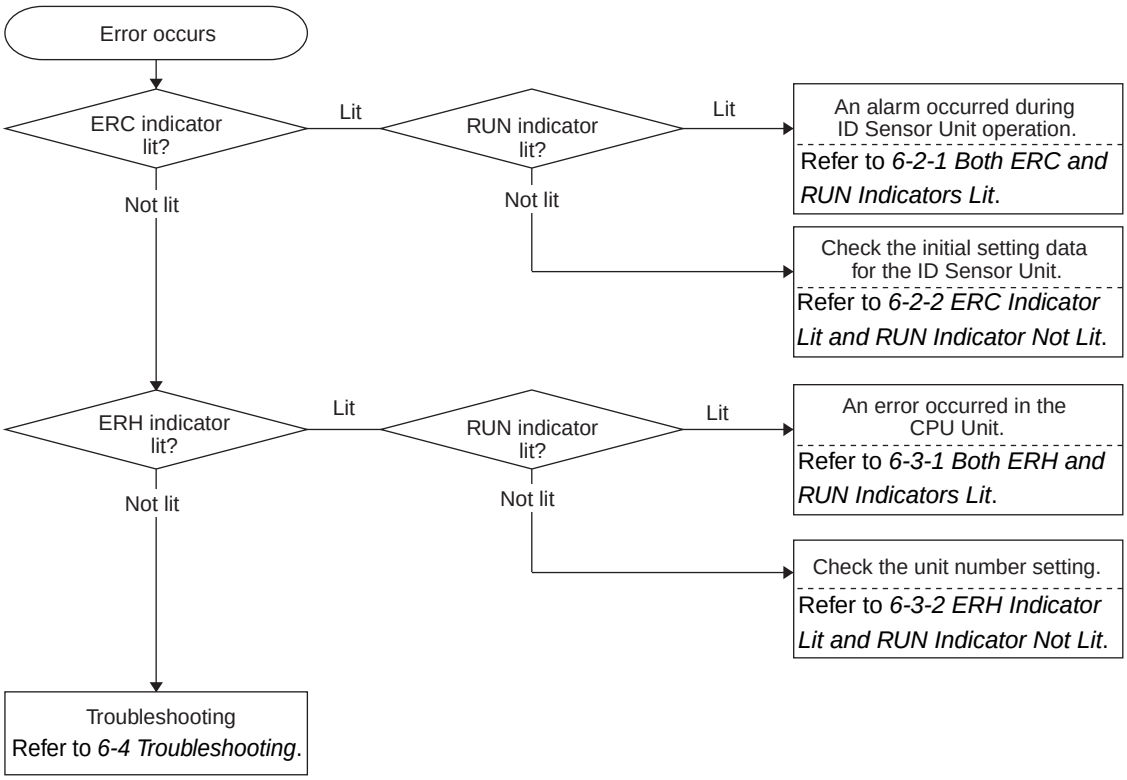
CJ1W-V680C12



Indicator		Name	Color	Meaning	
RUN		RUN	Green	❍ Lit	The ID Sensor Unit is operating normally.
				● Not lit	The ID Sensor Unit is stopped.
ERC		Unit error	Red	❍ Lit	An error has occurred in the ID Sensor Unit.
				● Not lit	No error has occurred in the ID Sensor Unit.
ERH		CPU Unit error	Red	❍ Lit	An error has occurred in the CPU Unit.
				● Not lit	No error has occurred in the CPU Unit.
ERP		Antenna power error	Red	❍ Lit	An error has occurred in the power supply to the Antenna.
				● Not lit	The power supply to the Antenna is normal.
Antenna 1 (HEAD1)	T/R	Communicating	Yellow	❍ Lit	Communications are active.
	NORM/ERR	Normal end	Green	❍ Lit	Communications with the ID Tag ended normally.
		Error end	Red	❍ Lit	Communications with the ID Tag ended in an error.
Antenna 2 (HEAD2)	T/R	Communicating	Yellow	❍ Lit	Communications are active.
	NORM/ERR	Normal end	Green	❍ Lit	Communications with the ID Tag ended normally.
		Error end	Red	❍ Lit	Communications with the ID Tag ended in an error.

6-1-2 Error Check Flowchart

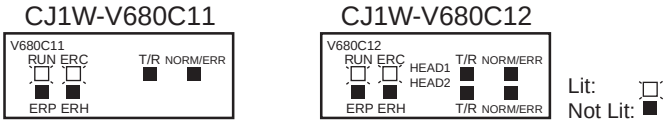
Use the following flowchart to check the error if an error occurs in the ID Sensor Unit.



6-2 ID Sensor Unit Alarms

If the ID Sensor Unit detects an alarm, the ERC indicator turns ON and the corresponding Status Flag is stored.

6-2-1 Both ERC and RUN Indicators Lit



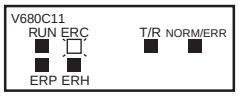
This alarm occurs if an error occurs during Unit operation.

The Unit will recover from this alarm automatically when the cause of the alarm is removed.

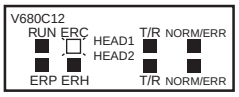
Input variables		Name of alarm	Meaning	Unit response	Correction
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (HEAD 1)	CJ1W-V680C12 Antenna 2 (HEAD 2)				
n+7	n+17				
*_Ch1_UnitBusySta	*_Ch2_UnitBusySta	Unit Busy	An error occurred during ID Sensor Unit operation	Unit operation will stop.	• Turn the power supply OFF and ON or restart the Unit. • Replace the ID Sensor Unit if the error persists even though the Unit is reset.

6-2-2 ERC Indicator Lit and RUN Indicator Not Lit

CJ1W-V680C11



CJ1W-V680C12



Lit:
Not lit:

This alarm occurs if an error occurs just after the ID Sensor Unit power is turned ON or the Unit is restarted.

Input variables		Name of alarm	Meaning	Unit response	Correction
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (HEAD 1)	CJ1W-V680C12 Antenna 2 (HEAD 2)				
*_Ch1_UnitBusySta	*_Ch2_UnitBusySta	Unit Busy	An error occurred in the ID Sensor Unit when the power supply was turned ON or immediately after the Unit was restarted.	Unit operation will stop.	• Turn the power supply OFF and ON or restart the Unit. • Replace the ID Sensor Unit if the error persists even though the Unit is reset.
*_Ch1_MemErr	*_Ch2_MemErr	Memory Error	An error occurred when memory was read.	Unit operation will stop.	• Turn the power supply OFF and ON or restart the Unit. • Replace the ID Sensor Unit if the error persists even though the Unit is reset.

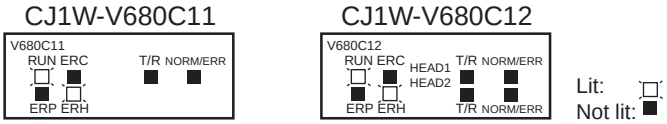
Input variables		Alarm name	Details	Possible remedy
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (HEAD 1)	CJ1W-V680C12 Antenna 2 (HEAD 2)			
*_Ch1_AntPwrSplyErr	*_Ch2_AntPwrSplyErr	Antenna Power Supply Error Flag	Becomes 1 when an Antenna power supply (24 V) error occurs.	• Check that the Antenna power supply is set correctly. • If the error is not reset, replace the hardware.
*_Ch1_AntTypErr	*_Ch2_AntTypErr	Antenna Error Flag	Becomes 1 if *_Ch#_AntConn (Antenna Connection Setting) does not match the V680-H01 connection status or the current consumption is excessive (number of connected antennas exceeds maximum).	
*_Ch1_IDTagCommErr	*_Ch2_IDTagCommErr	ID Tag Communication Error Flag	An error occurred in communications with a ID Tag, failing to end normally. *_Ch#_ProcRsltMon = 16#E070	• Check for excessive noise. • Check the travel speed. • Check the distance between the Antenna and ID Tag.
*_Ch1_VefyErr	*_Ch2_VefyErr	Verification Error	The correct data could not be written to the ID Tag. (Occurs only when verification is set for a write operation.) *_Ch#_ProcRsltMon = 16#E071	• Check the travel speed. • Check for excessive noise.
*_Ch1_IDTagMissingErr	*_Ch2_IDTagMissingErr	ID Tag Missing Error Flag	• The communications specification was for a trigger, but there was no ID Tag in the Communications Area. • The communications option was for single auto or repeat auto, and the Auto Wait Time expired. *_Ch#_ProcRsltMon = 16#E072	• The Antenna and ID Tag are too far apart. • The axis is misaligned.
*_Ch1_IDSysErr1	*_Ch2_IDSysErr1	ID System Error 1	An ID System error occurs. *_Ch#_ProcRsltMon = 16#E079	Please consult your OMRON representative.
*_Ch1_IDSysErr2	*_Ch2_IDSysErr2	ID System Error 2	An ID System error occurs. *_Ch#_ProcRsltMon = 16#E07E	Please consult your OMRON representative.
*_Ch1_IDSysErr3	*_Ch2_IDSysErr3	ID System Error 3	An ID System error occurs. *_Ch#_ProcRsltMon = 16#E07F	Please consult your OMRON representative.
*_Ch1_IDTagSta	*_Ch2_IDTagSta	ID Tag Status	• An overflow or underflow occurred for a Calculation Write command. • The data did not match in verification of the Data Check command. • The number of writes exceeded for a Number of Writes Control command. • An error occurred in the data for a Read with Error Correction command. *_Ch#_ProcRsltMon = 16#E076	Check the data settings.
			An error occurred while writing for a Copy command. *_Ch#_ProcRsltMon = 16#E076	The following errors may occur. Confirm the steps to handle each error. • ID Tag communications error • ID Tag verification error • ID Tag missing error • ID Tag address error • Antenna error • Protection error
*_Ch1_IDTagAdrErr	*_Ch2_IDTagAdrErr	ID Tag Address Error Flag	An address outside the ID Tag memory space was specified. *_Ch#_ProcRsltMon = 16#E07A	Specify the address correctly.
*_Ch1_AntErr	*_Ch2_AntErr	Antenna Error Flag	No Antenna is connected. *_Ch#_ProcRsltMon = 16#E07C	Check the Antenna connection.
*_Ch1_WrProtErr	*_Ch2_WrProtErr	Protection Error Flag	A write command was specified for a Write-protected Area. *_Ch#_ProcRsltMon = 16#E07D	• Specify the address and number of bytes correctly. • Cancel the write protection.

Input variables		Alarm name	Details	Possible remedy
CJ1W-V680C11/ CJ1W-V680C12 Antenna 1 (HEAD 1)	CJ1W-V680C12 Antenna 2 (HEAD 2)			
*_Ch1_ErrCorrection	*_Ch2_ErrCorrection	Error Correction Flag	Read with Error Correction performed a 1-bit error correction. *_Ch#_ProcRsltMon = 16#E077	
*_Ch1_DatStorageAreaErr	*_Ch2_DatStorageAreaErr	Data Storage Area Specification Error Flag	The Data Storage Area specification is not correct. *_Ch#_ProcRsltMon = 16#E014	Specify the Data Storage Area specification correctly.
*_Ch1_CmdErr	*_Ch2_CmdErr	Command Error Flag	The command to the ID Sensor Unit is not correct. *_Ch#_ProcRsltMon = 16#E014	Specify the command correctly.

6-3 CPU Unit Errors

The ERH indicator will light when the ID Sensor Unit cannot operate because an error occurred on the I/O bus or CPU Unit or when data cannot be refreshed with Special I/O Units.

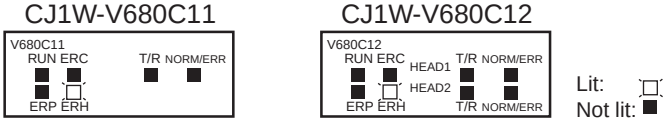
6-3-1 Both ERH and RUN Indicators Lit



The ERH and RUN indicators will light when an error occurs on the I/O bus, a WDT (watchdog timer) error occurs in the CPU Unit, or I/O refresh can not be executed normally between the CPU Unit and ID Sensor Unit. Turn the Controller power supply OFF and ON. Refer to the *NJ-series CPU Unit Hardware User's Manual (Cat. No. W500)* for details.

Error name	Error	Unit response
I/O bus check error	An error occurred in data transfer between the CPU Unit and the ID Sensor Unit.	Unit operation will stop.
CPU Unit monitor error	An error occurred because there was no response from the CPU Unit.	
CPU Unit WDT error	An error occurred in the CPU Unit.	

6-3-2 ERH Indicator Lit and RUN Indicator Not Lit



There is an error in the unit number setting for the ID Sensor Unit.
After changing the unit number setting, turn the Controller power supply OFF and ON.

Error name	Error	Unit response
Duplicate unit number	The same unit number is set for more than one Unit or was set to a value that is not between 00 and 95.	Unit operation will stop.
I/O setting check error	The model of Special I/O Unit registered in the Unit Configuration in the CPU Unit does not agree with the model of Special I/O Unit mounted in the system.	

6-3-3 Restarting Units

Restart the Unit after you change the settings in the Initial Settings Data Area and transfer them to the CPU unit or after you remove the cause of an error. Restart the Unit according to the method below.

The Initial Settings Data will be reflected after the Unit is restarted.

- Reset the Controller from Sysmac Studio.
- Restart the Unit from Sysmac Studio when initial settings parameters are transferred from Sysmac Studio.
- Turn on the Controller power supply again.
- Restart the Unit the Unit from the program by issuing a ResetUnit instruction.
- Restart using the system-defined variable.
  *_CJB_SIO**Restart* ** corresponds to the unit number from 00 to 95.
  Change the system-defined variables corresponding to the unit number from 0 to 1.

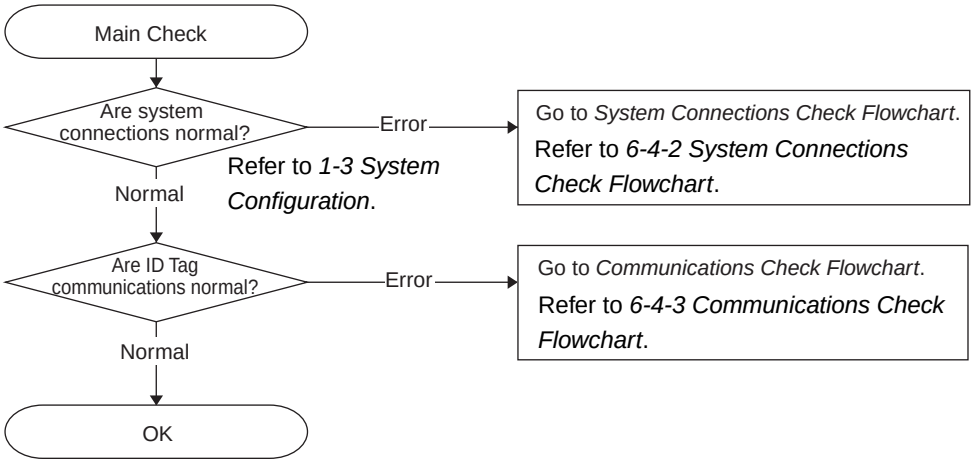
Precautions for Correct Use

If the error persists after the restart, replace this Unit.

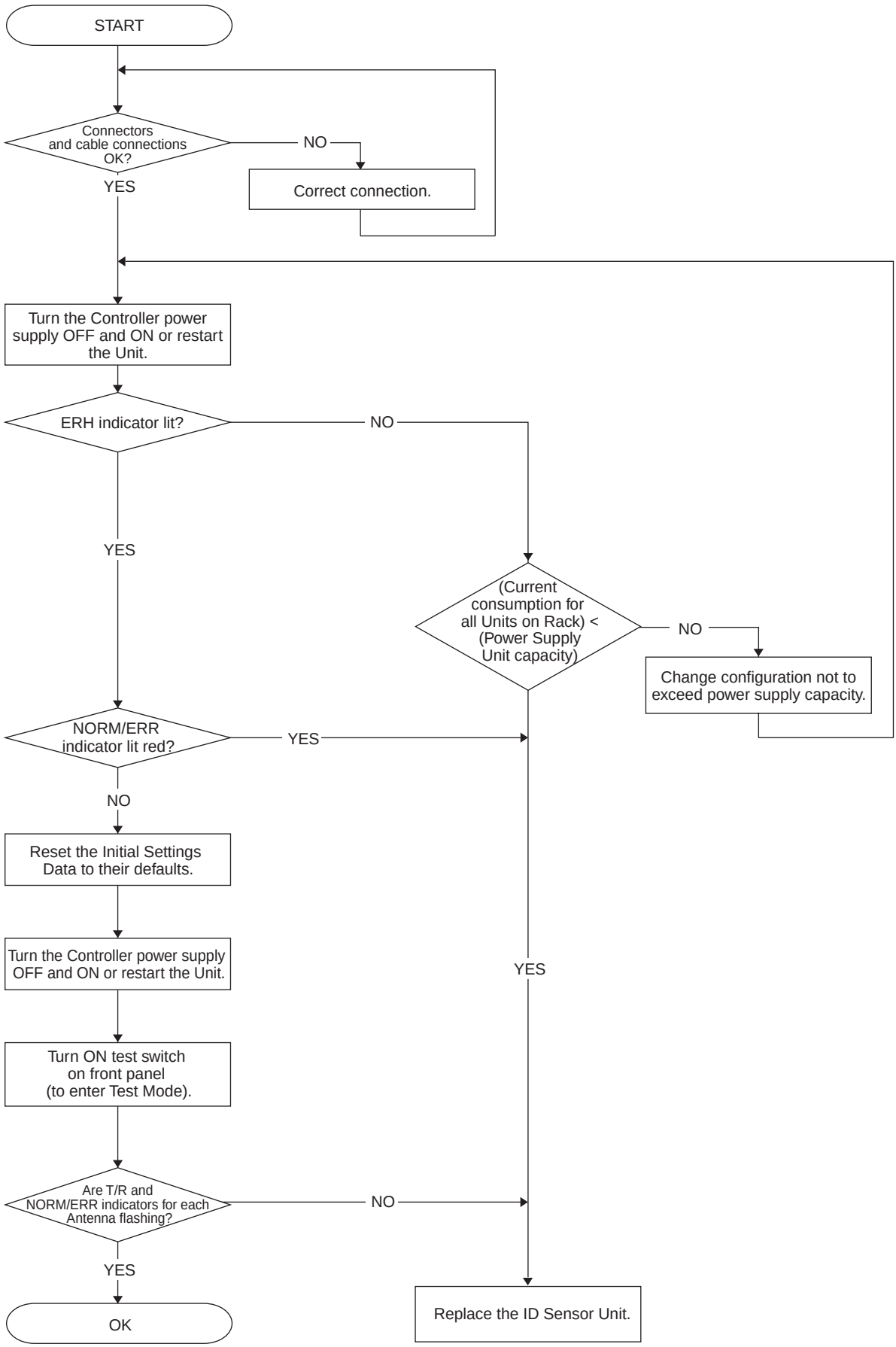
6-4 Troubleshooting

6-4-1 Main Check Flowchart

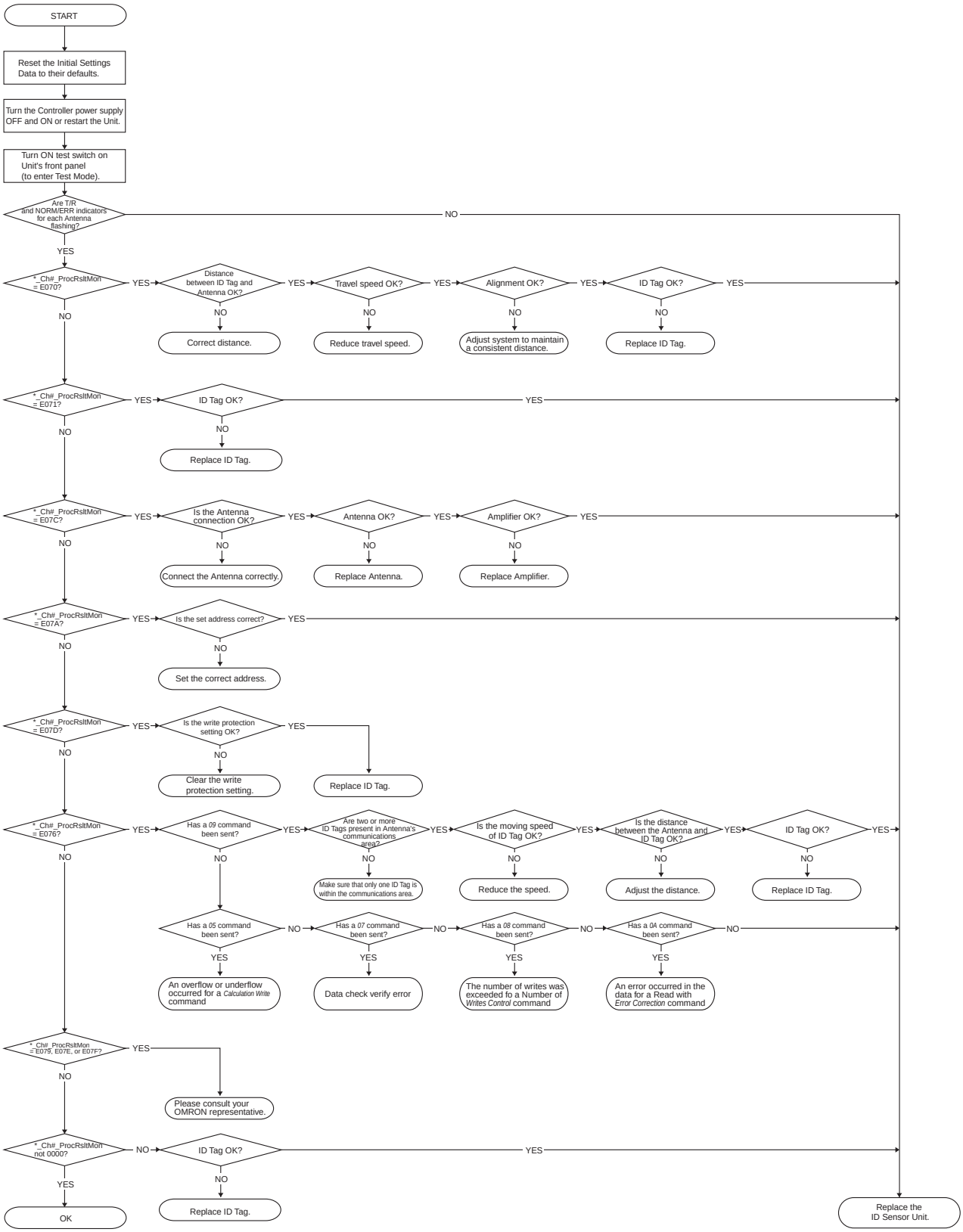
Use the Main Check Flowchart according to the nature of the error.



6-4-2 System Connections Check Flowchart



6-4-3 Communications Check Flowchart

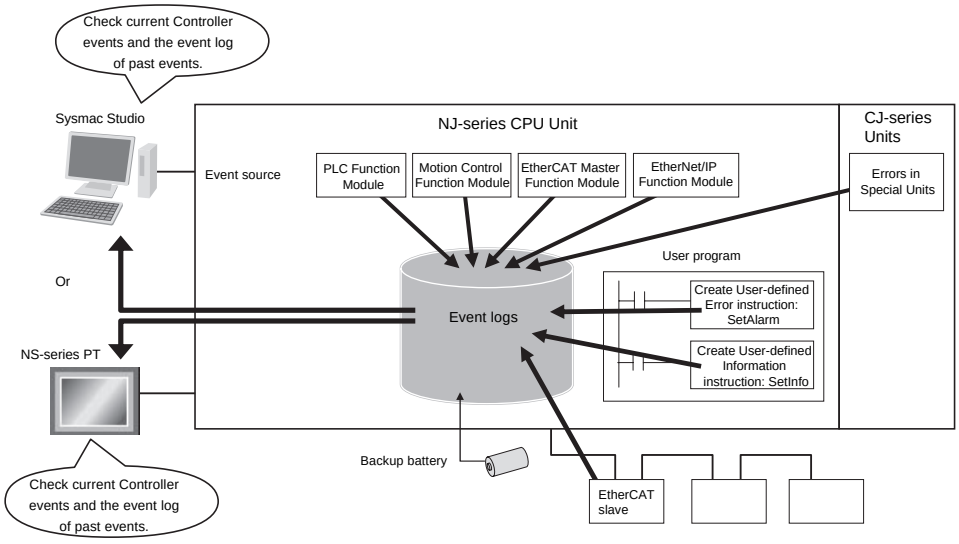


6-5 Event Logs

6-5-1 Overview of the Event Logs

You use the same methods to manage all of the events that occur on the NJ-series Controller. (The events include errors and information.) You can use the Sysmac Studio or an NS-series PT to confirm current Controller events and the logs of events that have occurred. These logs are called event logs. Controller errors that occur for this Unit are also reported as events in the NJ-series CPU Unit.

Refer to the *NJ-series CPU Unit Software User's Manual* (Cat. No. W501) for details on the event logs in an *NJ-series CPU Unit.* Refer to the *NJ-series Troubleshooting Manual* (Cat. No. W503) for details on Controller errors, confirmation methods, and corrections.



To use an NS-series PT to check events, connect the PT to the built-in EtherNet/IP port on the CPU Unit.

6-5-2 Error Table

The errors that may occur for this Unit are listed below. Event levels are given in the table as follows:

Maj: Major fault level

Prt: Partial fault level

Min: Minor fault level

Obs: Observation

Info: Information

Refer to the *NJ-series Troubleshooting Manual* (Cat. No. W503) for all of the event codes that may occur in an NJ-series Controller.

Event code	Event name	Meaning	Assumed cause	Level					Reference
				Maj	Prt	Min	Obs	Info	
046C 0000 hex	Unit Status, Antenna Power Supply Error	An error occurred in the power supply to the Antenna.	• An error occurred in the power supply (24 V) to the Antenna.			√			page 6-17
046D 0000 hex	Unit Status, Memory Error	An error occurred when reading non-volatile memory.	• There is a source of noise nearby. • Non-volatile memory failure			√			page 6-17
046E 0000 hex	Results Information, Antenna Error	An error occurred in the Antenna.	• The Antenna is not connected. • Antenna failure • The ID Sensor Unit failed.			√			page 6-18
046F 0000 hex	Unit Status, Unit Busy	An error occurred in an ID Sensor Unit.	• There is a source of noise nearby. • The ID Sensor Unit failed.			√			page 6-18
2440 0000 hex	Unit Status, Antenna Error	An error occurred in the Antenna.	• The setting of the Connected Antenna Setting (device variable *_Ch#_AntConn) does not agree with the Antenna that is connected. • The V680-H01 or V680-H01-V2 was connected to the CJ1W-V680C12.			√			page 6-19
3498 0000 hex	Results Information, Data Storage Area Specification Error	The data storage area specification is not correct.	• The user program specifies addresses in the DM, CIO, AR, EM, or other areas that exceed the ranges defined for the data storage area specifications.			√			page 6-19
54A0 0000 hex	Results Information, ID Tag Address Error	The address of the ID Tag is wrong.	• The address of an ID Tag specified in a command is incorrect.			√			page 6-20
54A1 0000 hex	Results Information, Write Protection Error	An attempt was made to write to a write-protected area of the ID Tag.	• The specified address or number of bytes is incorrect. • Write-protection is enabled for the area you attempted to write to in the ID Tag.			√			page 6-20
54A2 0000 hex	Results Information, Command Error	The command to the ID Sensor Unit is not correct.	• The contents of the following external device variables is not data that can be specified (where # is the channel number). *_Ch#_CmdSet *_Ch#_ProcAdr *_Ch#_ProcByte *_Ch#_CmdOption "#" in the variable name is the Antenna (Head) number.			√			page 6-21
648C 0000 hex	Unit Status, Command Error End	A processing error occurred.	• A processing error occurred.			√			page 6-21
648D 0000 hex	Results Information, Verification Error	The correct data could not be written to the ID Tag.	• The travel speed of the ID Tag is outside the specified range. • The distance between the Antenna and ID Tag is outside the specified range. • Noise			√			page 6-22

Event code	Event name	Meaning	Assumed cause	Level					Reference
				Maj	Prt	Min	Obs	Info	
648E0000 hex	Results Information, ID Tag Communications Error	An error occurred in communications with an ID Tag, preventing a normal end.	• The travel speed of the ID Tag is outside the specified range. • The distance between the Antenna and ID Tag is outside the specified range. • Noise			√			page 6-22
648F0000 hex	Results Information, ID Tag Missing Error	There is no ID Tag in the communications area.	• The communications specification is set to trigger, and the ID Tag is not in the communications area when the trigger occurs. • The communications specification is set to single auto or repeat auto, and the wait time reached the Auto Wait Time. • An Amplifier is connected, but an Antenna is not connected.			√			page 6-23
64900000 hex	Results Information, ID System Error 1	ID system error 1 occurred.	• System error 1 occurred.			√			page 6-23
64910000 hex	Results Information, ID System Error 2	ID system error 2 occurred.	• System error 2 occurred.			√			page 6-23
64920000 hex	Results Information, ID System Error 3	ID system error 3 occurred.	• System error 3 occurred.			√			page 6-24
64930000 hex	Results Information, ID Tag Status	One of the following occurred. • The number of writes was exceeded for a Number of Writes Control command. • An overflow or underflow occurred for a Calculation Write command. • The data did not verify for a Data Check command. • An error occurred in the data for a Read with Error Correction command. • An error occurred when writing for a Copy command.	• The number of writes was exceeded for a Number of Writes Control command. • An overflow or underflow occurred for a Calculation Write command. • The data did not verify for a Data Check command. • An error occurred in the data for a Read with Error Correction command. • An error occurred when writing for a Copy command.			√			page 6-24
64940000 hex	Results Information, Error Correction	A Write with Error Correction command performed a 1-bit error correction.	• There is ambient noise where the ID Tag is used. • ID Tag error.			√			page 6-25

6-5-3 Error Descriptions

This section describes the information that is given for individual errors.

Controller Error Descriptions

The items that are used to describe individual errors (events) are described in the following copy of an error table.

<table>
<tr><td>Event name</td><td colspan="3">Gives the name of the error.</td><td>Event code</td><td colspan="2">Gives the code of the error.</td></tr>
<tr><td>Meaning</td><td colspan="6">Gives a short description of the error.</td></tr>
<tr><td>Source</td><td colspan="2">Gives the source of the error.</td><td>Source details</td><td>Gives details on the source of the error.</td><td>Detection timing</td><td>Tells when the error is detected.</td></tr>
<tr><td>Error attributes</td><td>Level</td><td>Tells the level of influence on control.*1</td><td>Recovery</td><td>Gives the recovery method.*2</td><td>Log category</td><td>Tells which log the error is saved in.*3</td></tr>
<tr><td>Effects</td><td>User program</td><td>Tells what will happen to execution of the user program.*4</td><td>Operation</td><td colspan="3">Provides special information on the operation that results from the error (event).</td></tr>
<tr><td rowspan="2">System-defined variables</td><td colspan="2">Variable</td><td colspan="2">Data type</td><td colspan="2">Name</td></tr>
<tr><td colspan="6">Lists the variable names, data types, and meanings for system-defined variables that provide direct error notification, that are directly affected by the error, or that contain settings that cause the error.</td></tr>
<tr><td rowspan="2">Cause and correction</td><td colspan="2">Assumed cause</td><td colspan="2">Correction</td><td colspan="2">Prevention</td></tr>
<tr><td colspan="6">Lists the possible causes, corrections, and preventive measures for the error.</td></tr>
<tr><td>Attached information</td><td colspan="6">This is the attached information that is displayed by the Sysmac Studio or an NS-series PT.</td></tr>
<tr><td>Precautions/ Remarks</td><td colspan="6">Provides precautions, restrictions, and supplemental information.</td></tr>
</table>

*1 One of the following:
Major fault: Major fault level
Partial fault: Partial fault level
Minor fault: Minor fault level
Observation
Information

*2 One of the following:
Automatic recovery: Normal status is restored automatically when the cause of the error is removed.
Error reset: Normal status is restored when the error is reset after the cause of the error is removed.
Cycle the power supply: Normal status is restored when the power supply to the Controller is turned OFF and then back ON after the cause of the error is removed.
Controller reset: Normal status is restored when the Controller is reset after the cause of the error is removed.
Depends on cause: The recovery method depends on the cause of the error.

*3 One of the following:
System: System event log
Access: Access event log

*4 One of the following:
Continues: Execution of the user program will continue.
Stops: Execution of the user program stops.
Starts: Execution of the user program starts.

Error Descriptions

Event name	Unit Status, Antenna Power Supply Error			Event code	046C 0000 hex	
Meaning	An error occurred in the power supply to the Antenna.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	ID Tag reading and writing are disabled.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	An error occurred in the power supply (24 V) to the Antenna.		Mount the ID Sensor Unit securely. If this error persists even after you make the above corrections, replace the ID Sensor Unit.		Check to see if the ID Sensor Unit is securely mounted.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Unit Status, Memory Error			Event code	046D 0000 hex	
Meaning	An error occurred when reading non-volatile memory.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At power ON or Controller reset
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	ID Tag reading and writing are disabled.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	There is a source of noise nearby.		Implement noise countermeasures.		Use the Unit away from sources of noise.	
	Non-volatile memory failure		If the above cause does not apply, replace the ID Sensor Unit.		None	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, Antenna Error		Event code	046E0000 hex	
Meaning	An error occurred in the Antenna.				
Source	PLC Function Module	Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	ID Tag reading and writing are disabled.	
System-defined variables	Variable		Data type	Name	
	None		---	---	
Cause and correction	Assumed cause		Correction	Prevention	
	The Antenna is not connected.		Connect the Antenna.	Make sure that the Antenna is connected.	
	Antenna failure		Replace the Antenna.	None	
	The ID Sensor Unit failed.		If operation is not normal after you replace the Antenna, replace the ID Sensor Unit.	None	
Attached information	Attached information 1: Antenna or Head number where error was detected				
Precautions/ Remarks	None				

Event name	Unit Status, Unit Busy		Event code	046F0000 hex	
Meaning	An error occurred in an ID Sensor Unit.				
Source	PLC Function Module	Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	Operation of the ID Sensor Unit stops.	
System-defined variables	Variable		Data type	Name	
	None		---	---	
Cause and correction	Assumed cause		Correction	Prevention	
	There is a source of noise nearby.		Remove any nearby sources of noise.	Use the Unit away from sources of noise.	
	The ID Sensor Unit failed.		If the above cause does not apply, replace the ID Sensor Unit.	None	
Attached information	Antenna or Head number where error was detected				
Precautions/ Remarks	None				

Event name	Unit Status, Antenna Error			Event code	24400000 hex	
Meaning	An error occurred in the Antenna.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	ID Tag reading and writing are disabled.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The setting of the Connected Antenna Setting (device variable *_Ch#_AntConn*) does not agree with the Antenna that is connected.		Set the Connected Antenna Setting (device variable *_Ch#_AntConn*) to agree with the Antenna that is connected.		Set the Connected Antenna Setting (device variable *_Ch#_AntConn*) to agree with the Antenna that is connected.	
	The V680-H01 or V680-H01-V2 was connected to the CJ1W-V680C12.		Connect an Antenna other than the V680-H01 or V680-H01-V2 to the CJ1W-V680C12.		Connect an Antenna other than the V680-H01 or V680-H01-V2 to the CJ1W-V680C12.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, Data Storage Area Specification Error			Event code	34980000 hex	
Meaning	The data storage area specification is not correct.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The user program specifies addresses in the DM, CIO, AR, EM, or other areas that exceed the ranges defined for the data storage area specifications.		Correct the data storage area specifications so that they are within the defined range.		Set the data storage area specifications so that they are within the defined range.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, ID Tag Address Error		Event code	54A0 0000 hex		
Meaning	The address of the ID Tag is wrong.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The address of an ID Tag specified in a command is incorrect.		Check the memory capacity of the ID Tag that is used, and then make corrections so that the specified address is in the range of the memory capacity.		Check the address specifications of the ID Tag that is used and specify the correct ID Tag address.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, Write Protection Error		Event code	54A1 0000 hex		
Meaning	An attempt was made to write to a write-protected area of the ID Tag.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The specified address or number of bytes is incorrect.		Make corrections so that the specified address and number of bytes are correct.		Specify the correct address and number of bytes.	
	Write-protection is enabled for the area you attempted to write to in the ID Tag.		Remove write protection.		Remove write protections from the area to write.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, Command Error			Event code	54A20000 hex	
Meaning	The command to the ID Sensor Unit is not correct.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The contents of the following external device variables is not data that can be specified (where # is the channel number). *_Ch#_CmdSet *_Ch#_ProcAdr *_Ch#_ProcByte *_Ch#_CmdOption "#" in the variable name is the Antenna (Head) number.		Correct the commands so that they match the contents in the tables for *Command and Option Settings*.		Set the commands so that they match the contents in the tables for *Command and Option Settings*.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Unit Status, Command Error End			Event code	648C0000 hex	
Meaning	A processing error occurred.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Depends on the cause.	Log category	System
Effects	User program	Continues.	Operation	Depends on the nature of the error. Check the error information in the manual.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	A processing error occurred.		Check the error type in the results information in the event log, and then perform corrective actions accordingly.		Perform corrective actions following the descriptions for errors given in the manual.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	When the processing error occurs, device variable **_Ch1_ErrEndSta* or **_Ch2_ErrEndSta* will be TRUE for one task period.					

Event name	Results Information, Verification Error		Event code	648D 0000 hex		
Meaning	The correct data could not be written to the ID Tag.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected. It is possible that writing data to an ID Tag from the ID Senor Unit will fail again.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The travel speed of the ID Tag is outside the specified range.		If the ID Tag is traveling faster than the specified speed range, change the speed so that it is within the specified speed range.		Set the travel speed of the ID Tags to within the specified range.	
	The distance between the Antenna and ID Tag is outside the specified range.		If the distance between the Antenna and ID Tag exceeds the specified range, change the distance so that it is within the specified range.		Set the distance between the Antenna and ID Tag to within the specified range.	
	Noise		Implement noise countermeasures if there is excessive ambient noise.		Implement noise countermeasures if there is excessive ambient noise.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, ID Tag Communications Error		Event code	648E 0000 hex		
Meaning	An error occurred in communications with an ID Tag, preventing a normal end.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected. It is possible that communications with an ID Tag from the ID Sensor Unit will fail again.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The travel speed of the ID Tag is outside the specified range.		If the ID Tag is traveling faster than the specified speed range, change the speed so that it is within the specified speed range.		Set the travel speed of the ID Tags to within the specified range.	
	The distance between the Antenna and ID Tag is outside the specified range.		If the distance between the Antenna and ID Tag exceeds the specified range, change the distance so that it is within the specified range.		Set the distance between the Antenna and ID Tag to within the specified range.	
	Noise		Implement noise countermeasures if there is excessive ambient noise.		Implement noise countermeasures if there is excessive ambient noise.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, ID Tag Missing Error			Event code	648F0000 hex	
Meaning	There is no ID Tag in the communications area.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The communications specification is set to trigger, and the ID Tag is not in the communications area when the trigger occurs.		Adjust the system so that an ID Tag will be in the communications area when the trigger occurs.		Design the system so that the ID Tag will be in the communications area when the trigger occurs.	
	The communications specification is set to single auto or repeat auto, and the wait time reached the Auto Wait Time.		Adjust the system so that an ID Tag will be in the communications area within the Auto Wait Time.		Set the system so that an ID Tag will be in the communications area within the Auto Wait Time.	
	An Amplifier is connected, but an Antenna is not connected.		Connect the Antenna.		Make sure that the Antenna is connected.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, ID System Error 1			Event code	64900000 hex	
Meaning	ID system error 1 occurred.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	System error 1 occurred.		Consult your OMRON representative.		None	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, ID System Error 2			Event code	64910000 hex	
Meaning	ID system error 2 occurred.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	System error 2 occurred.		Consult your OMRON representative.		None	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, ID System Error 3		Event code	64920000 hex		
Meaning	ID system error 3 occurred.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	System error 3 occurred.		Consult your OMRON representative.		None	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, ID Tag Status		Event code	64930000 hex		
Meaning	One of the following occurred. • The number of writes was exceeded for a Number of Writes Control command. • An overflow or underflow occurred for a Calculation Write command. • The data did not verify for a Data Check command. • An error occurred in the data for a Read with Error Correction command. • An error occurred when writing for a Copy command.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The number of writes was exceeded for a Number of Writes Control command.		Replace the ID Tag.		(This is intended to detect when the number of overwrites is exceeded, and so no measures are required for prevention.)	
	An overflow or underflow occurred for a Calculation Write command.		Check the data for which the data check was performed and make sure that data was not unexpectedly written. If data was not unexpectedly written, a memory error occurred. Replace the ID Tag.		Make sure that unexpected write operations do not occur.	
	The data did not verify for a Data Check command.					
	An error occurred in the data for a Read with Error Correction command.					
	One of the following errors occurred when writing for a Copy command. • Results Information, ID Tag Communications Error • Results Information, Verification Error • Results Information, ID Tag Missing Error • Results Information, ID Tag Address Error • Results Information, Antenna Error • Results Information, Write Protection Error		Check the countermeasures for the error that occurred.		Perform countermeasures in advance for the errors given on the left.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

Event name	Results Information, Error Correction			Event code	64940000 hex	
Meaning	A Write with Error Correction command performed a 1-bit error correction.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	At command execution
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	Not affected. Error correction, however, may occur again for the same ID Tag, and a reading error may occur.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	There is ambient noise where the ID Tag is used.		Implement noise countermeasures.		Implement measures against ambient noise where the ID Tag is used.	
	ID Tag error.		If this error occurs for an ID Tag on which data correction has been performed, stop using the ID Tag and replace it with another ID Tag.		If this error occurs for an ID Tag on which data correction has been performed, stop using the ID Tag and replace it with another ID Tag.	
Attached information	Attached information 1: Antenna or Head number where error was detected					
Precautions/ Remarks	None					

App

Appendices

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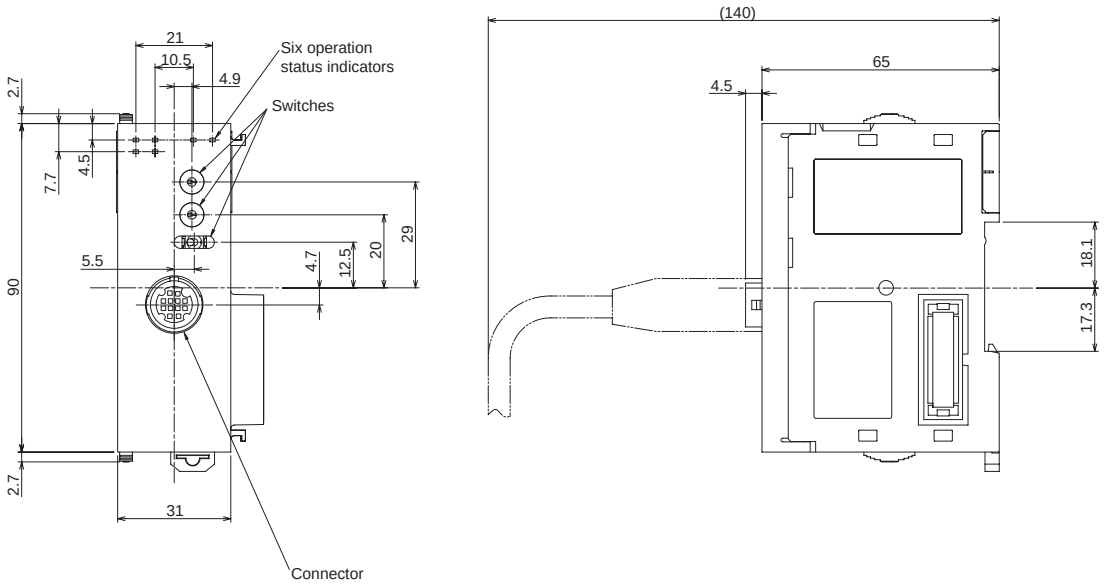
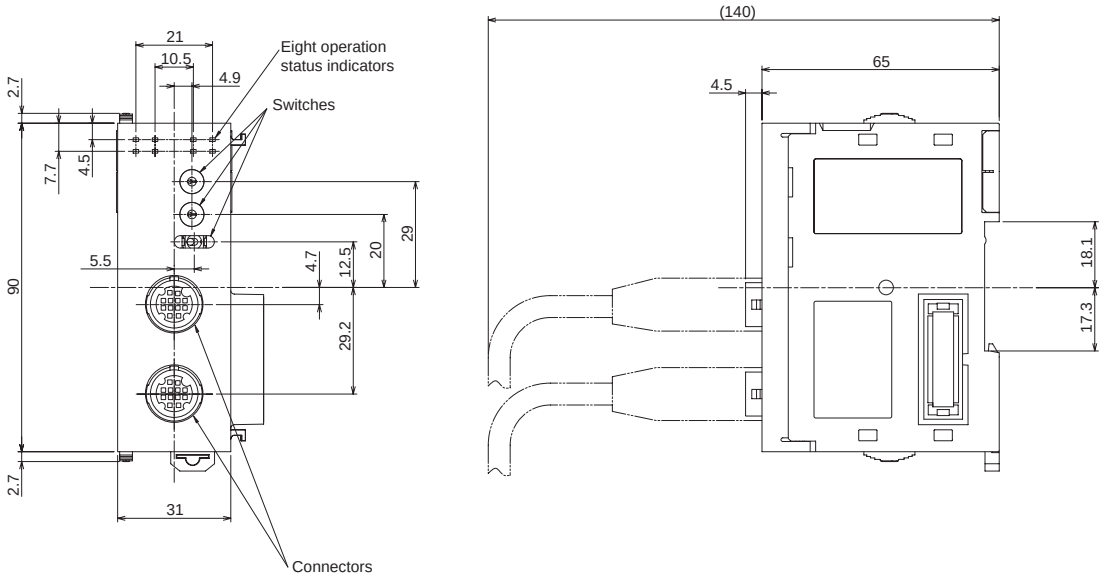
A-1 Dimensions

A-1-1 CJ1W-V680C11



A-1-2 CJ1W-V680C12



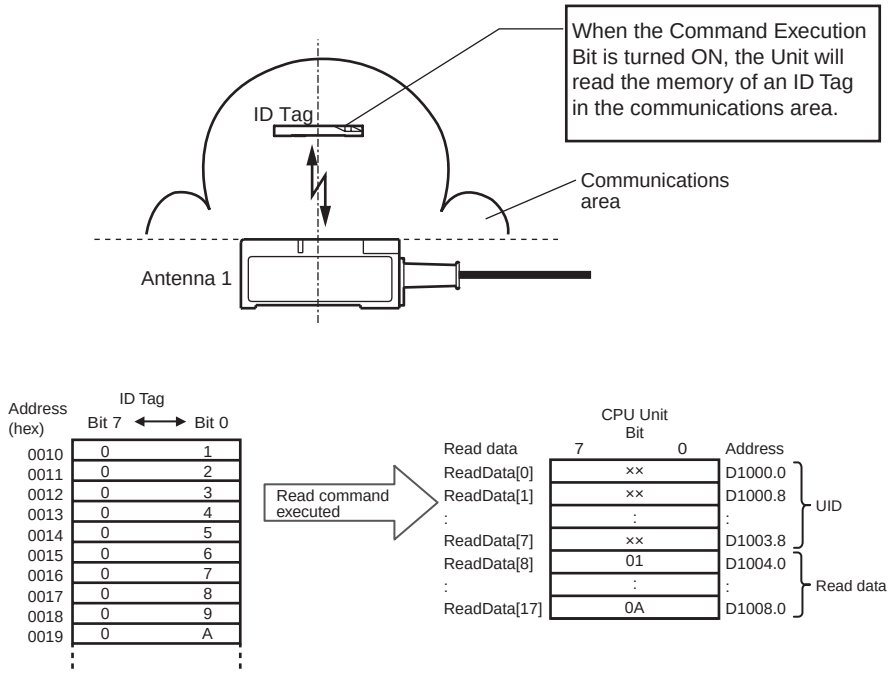
A-2 Sample Programming

Read, Communications Specification: Trigger

● Outline

This example shows how to read the memory of an ID Tag that is present in the area for Antenna 1 and to store the result in a byte array variable.

In this example, the device name "RFID" is used when this Unit is registered in Unit Configuration.



● Initial Settings Data

Name	Setup data device variable	Data type	Set value: Settings	
System Settings (Antenna 1)	RFID_Ch1_SysSet	WORD	16#0000	UID Addition: Enabled, Test Switch: Enabled, Write Verification: Verification, Communications Speed: Normal
UID Addition	Bits 12 to 15	---	16#0	Enabled
Test switch	Bits 08 to 11	---	16#0	Enabled
Write Verification	Bits 04 to 07	---	16#0	Verification
Communications Speed	Bits 00 to 03	---	16#0	Normal
Auto Wait Time Setting (Antenna 1)	RFID_Ch1_AutoWaitTm	WORD	16#0000	0.0 s (No timeout)
Write Protection Setting (Antenna 1)	RFID_Ch1_WrProt	USINT	0	V680 method
Antenna Connection Setting (Antenna 1)	RFID_Ch1_AntConn	USINT	0	Standard Antenna

Name	Set value			
	Setup data device variable	Data type	Settings	
Results Monitor Setting (Antenna 1)	RFID_Ch1_ProcRsltMonCfg	USINT	0	Communications Time Display
Run/Test Switching Method Setting	RFID_MethChgRunTest	WORD	16#0000	Test switch
Tag Memory Type Setting	RFID_TagMemTyp	USINT	0	Standard mode
Test Operation	RFID_TestExec	BYTE	16#00	Communications test
Test Antenna	RFID_AntForTest	USINT	1	Antenna 1
Number of Test Bytes	RFID_ByteForTest	UINT	0	0 byte

● Defined Variables

Command Setting

Name	Data type	Factory setting	Allocated address (AT)	Comments	Settings in program
RFID_Ch1_CmdSet	WORD	16#0000	IOBus://rack#0/slot#0/Ch1_CmdSet	Command Setting (Antenna 1)	16#0000 (Read, trigger, data storage order: Rightmost → Leftmost)
RFID_Ch1_ProcAdr	UINT	0	IOBus://rack#0/slot#0/Ch1_ProcAdr	Processing Address (Antenna 1)	16 (Address 16)
RFID_Ch1_ProcByte	UINT	0	IOBus://rack#0/slot#0/Ch1_ProcByte	Number of Processing Bytes (Antenna 1)	10 (10 bytes)
RFID_Ch1_DatStorageSet	DWORD	16#0000 0000	IOBus://rack#0/slot#0/Ch1_DatStorageSet	Data Storage Area Setting (Antenna 1)	16#00001000 (Data storage area type and address D01000)
RFID_Ch1_CmdOption	UINT	0	IOBus://rack#0/slot#0/Ch1_CmdOption	Command Option (Antenna 1)	0 (No option specification)

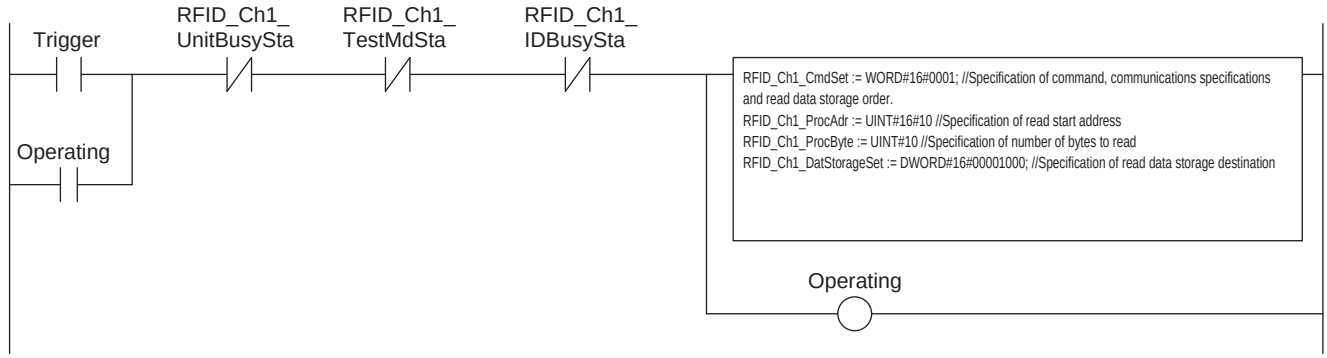
Instruction and status

Name	Data type	Factory setting	Allocated address (AT)	Comments
RFID_Ch1_ExecCmd	BOOL	False	IOBus://rack#0/slot#0/Ch1_ExecCmd	Command Execution Bit (Antenna 1)
RFID_Ch1_IDBusySta	BOOL	False	IOBus://rack#0/slot#0/Ch1_IDBusySta	ID Busy (Antenna 1)
RFID_Ch1_NormEndSta	BOOL	False	IOBus://rack#0/slot#0/Ch1_NormEndSta	Command Normal End (Antenna 1)
RFID_Ch1_ErrEndSta	BOOL	False	IOBus://rack#0/slot#0/Ch1_ErrEndSta	Command Error End (Antenna 1)
RFID_Ch1_TestMdSta	BOOL	False	IOBus://rack#0/slot#0/Ch1_TestMdSta	Test Mode (Antenna 1)
RFID_Ch1_UnitBusySta	BOOL	False	IOBus://rack#0/slot#0/Ch1_UnitBusySta	Unit Busy (Antenna 1)

● User-defined Variables

Name	Data type	Factory setting	Allocated address (AT)	Comments
Trigger	BOOL	False	---	Execution Input
Operating	BOOL	False	---	Command Execution Start
NormalEnd	BOOL	False	---	Normal End
ErrorEnd	BOOL	False	---	Error End
ReadData	ARRAY[0..17] OF BYTE	[18(16#0)]	%D1000*	Read data

* When HR, DM, or EM is specified as an allocated address (AT) for user-defined variables, set the Retain Attribute to Retained. When CIO/WR is specified, set it to Unretained.

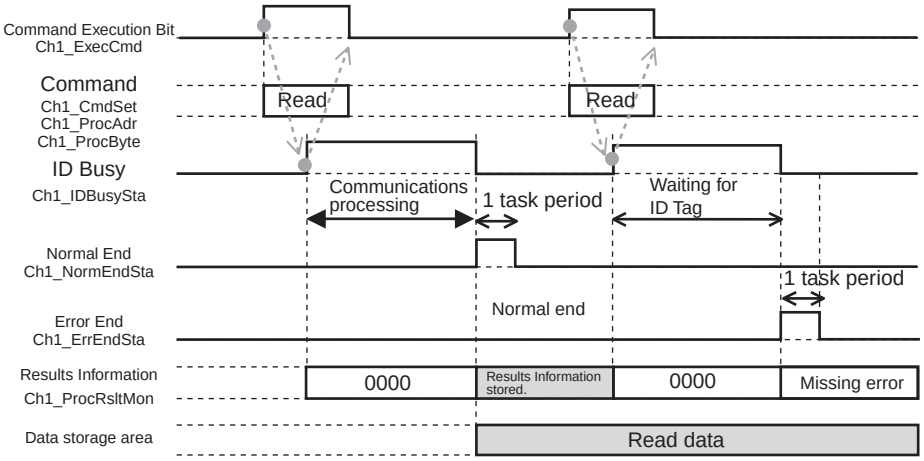


Command Execution Bit

Normal End

Error End

● Timing Chart



- If communications with the ID Tag fail, the error flags in the Results Information will turn ON, and the error code will be placed in the Processing Results Monitor. The previous read data will not be changed.
- To confirm the execution results from the user program, use the ON status of the Command Normal End or Command Error End in the Unit Status.
- Do not turn the Command Execution Bit OFF and ON during command execution (i.e., while the ID Busy is ON). It will be ignored.

A-3 Functional Differences due to CPU Units (NJ/CJ-series) to be Connected

You can use this Unit with NJ-series CPU Units.

If this Unit is used with the NJ Series, some functions become unavailable compared to when it is used with the CJ-series.

The following explains how each function of this Unit changes when a CJ-series CPU Unit is connected, compared when a NJ-series CPU Unit is connected.

Functional Difference

Model		Functional Difference
ID Sensor Units	CJ1W-V680C11	The data transfer function using intelligent I/O commands can not be used.
	CJ1W-V680C12	

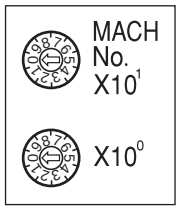
A-4 Correspondence Table of Device Variables for CJ-series Unit and Memory Used for CJ-series Unit Addresses

If this Unit is used with an NJ-series CPU Unit, various functions of the Unit are used based on device variables for CJ-series Unit that reference the memory used for CJ-series Unit from the user program.

Correspondences regarding word addresses, bit positions and device variables for CJ-series Unit between the I/O memory of the CJ-series CPU Unit and memory used for CJ-series Unit of the NJ-series CPU Unit are shown below.

Start address of special I/O Unit area: n = CIO2000 + Unit number × 10 (Unit number: 0 to 95)

Start address of special I/O Unit DM area: m = D20000 + Unit number × 100 (Unit number: 0 to 95)



The relay number and DM number determined by the ID Sensor Unit are set by the unit number switches on the front panel of the Unit.

Switch No.	Unit No.	CJ1W-V680C11		CJ1W-V680C12	
		Words allocated in Special I/O Unit Area	DM numbers allocated in Special I/O Unit DM Area	Words allocated in Special I/O Unit Area	DM numbers allocated in Special I/O Unit DM Area
0	Unit 0	CIO2000–CIO2009	D20000–D20099	CIO2000–CIO2019	D20000–D20199
1	Unit 1	CIO2010–CIO2019	D20100–D20199	CIO2010–CIO2029	D20100–D20299
2	Unit 2	CIO2020–CIO2029	D20200–D20299	CIO2020–CIO2039	D20200–D20399
3	Unit 3	CIO2030–CIO2039	D20300–D20399	CIO2030–CIO2049	D20300–D20499
4	Unit 4	CIO2040–CIO2049	D20400–D20499	CIO2040–CIO2059	D20400–D20599
5	Unit 5	CIO2050–CIO2059	D20500–D20599	CIO2050–CIO2069	D20500–D20699
6	Unit 6	CIO2060–CIO2069	D20600–D20699	CIO2060–CIO2079	D20600–D20799
7	Unit 7	CIO2070–CIO2079	D20700–D20799	CIO2070–CIO2089	D20700–D20899
8	Unit 8	CIO2080–CIO2089	D20800–D20899	CIO2080–CIO2099	D20800–D20999
9	Unit 9	CIO2090–CIO2099	D20900–D20999	CIO2090–CIO2109	D20900–D21009
⋮	⋮	⋮	⋮	⋮	⋮
n	Unit n	CIO2000+n×10–CIO2000+n×10+9	D20000+n×100–D20000+n×100+99 words	CIO2000+n×10–CIO2000+n×10+19	D20000+n×100–D20000+n×100+199 words
⋮	⋮	⋮	⋮	⋮	⋮
94	Unit 94	CIO2940–CIO2949	D29400–D29499	CIO2940–CIO2959	D29400–D29599
95	Unit 95	CIO2950–CIO2959	D29500–D29599	Cannot be set	

The ID Sensor Unit CJ1W-V680C11 occupies one unit number and CJ1W-V680C12 occupies two unit numbers. Accordingly with CJ1W-V680C12, you can set a unit number from 0 to 94.

Additional Information

- If two or more Special I/O Units are assigned the same unit number or Special I/O Unit Area, a "Duplicate Unit Number" major fault level Controller error occurs and the Unit will not operate.
- After changing the unit number setting, turn the Controller power supply OFF and ON.

A-4-1 CJ1W-V680C11

Special I/O Unit Area

I/O	CJ-series I/O memory address		NJ-series Device variables for CJ-series Unit		
	Word number	Bit number	Variable names	Description	Data type
Output (CPU to this Unit)	n	00	*_Ch1_ExecCmd	Command Execution Bit (Antenna 1)	BOOL
		01	*_Ch1_ErrRst	Error Reset Bit (Antenna 1)	BOOL
		02	*_Ch1_AbtCmd	Abort Bit (Antenna 1)	BOOL
		15	*_Ch1_RunTestChg	RUN/TEST Bit (Antenna 1)	BOOL
	n+1	00-15	*_Ch1_CmdSet	Command Setting (Antenna 1)	WORD
	n+2	00-15	*_Ch1_ProcAdr	Processing Address (Antenna 1)	UINT
	n+3	00-15	*_Ch1_ProcByte	Number of Processing Bytes (Antenna 1)	UINT
	n+4	00-15	*_Ch1_DatStorageSet	Data Storage Area Setting (Antenna 1)	DWORD
	n+5	00-15			
	n+6	00-15	*_Ch1_CmdOption	Command Option (Antenna 1)	UINT
Input (This Unit to CPU)	n+7	00	*_Ch1_IDBusySta	ID Busy	BOOL
		01	*_Ch1_NormEndSta	Command Normal End	BOOL
		02	*_Ch1_ErrEndSta	Command Error End	BOOL
		11	*_Ch1_AntTypErr	Antenna Error	BOOL
		12	*_Ch1_MemErr	Memory Error	BOOL
		13	*_Ch1_AntPwrSplyErr	Antenna Power Supply Error	BOOL
		14	*_Ch1_TestMdSta	Test Mode	BOOL
		15	*_Ch1_UnitBusySta	Unit Busy	BOOL
	n+8	00	*_Ch1_CmdErr	Command Error	BOOL
		01	*_Ch1_DatStorageAreaErr	Data Storage Area Specification Error	BOOL
		03	*_Ch1_ErrCorrection	Error Correction	BOOL
		04	*_Ch1_IDTagSta	ID Tag Status	BOOL
		07	*_Ch1_IDSysErr3	ID System Error 3	BOOL
		08	*_Ch1_IDSysErr2	ID System Error 2	BOOL
		09	*_Ch1_IDSysErr1	ID System Error 1	BOOL
		10	*_Ch1_IDTagMissingErr	ID Tag Missing Error	BOOL
		11	*_Ch1_WrProtErr	Protection Error	BOOL
		12	*_Ch1_IDTagCommErr	ID Tag Communications Error	BOOL
		13	*_Ch1_IDTagAdrErr	ID Tag Address Error	BOOL
		14	*_Ch1_VefyErr	Verification Error	BOOL
		15	*_Ch1_AntErr	Antenna Error	BOOL
	n+9	00-15	*_Ch1_ProcRsltMon	Processing Results Monitor	WORD

Special I/O Unit DM Area

CJ-series I/O memory address		NJ-series Device variables for CJ-series Unit		
DM number	Bit number	Variable names	Description	Data type
D (m)	00-15	*_Ch1_SysSet	System Settings (Antenna 1)	WORD
D (m+1)	00-15	*_Ch1_AutoWaitTm	Auto Wait Time Setting (Antenna 1)	UINT
D (m+2)	00-07	*_Ch1_WrProt	Write Protection Setting (Antenna 1)	USINT
D (m+3)	00-03	*_Ch1_AntConn	Antenna Connection Setting (Antenna 1)	USINT
D (m+4)	00-03	*_Ch1_ProcRsltMonCfg	Results Monitor Setting (Antenna 1)	USINT
D (m+50)	00-07	*_AntForTest	Test Antenna	USINT
	08-15	*_TestExec	Test Operation	BYTE
D (m+51)	00-15	*_ByteForTest	Number of Test Bytes	UINT
D (m+80)	00-03	*_MethChgRunTest	Run/Test Switching Method Setting	WORD
D (m+81)	00-03	*_TagMemTyp	Tag Memory Type Setting	USINT

A-4-2 CJ1W-V680C12

Special I/O Unit Area

I/O	CJ-series I/O memory address		NJ-series Device variables for CJ-series Unit			
	Word number	Bit number	Variable names	Description		Data type
Output (CPU to this Unit)	n	00	*_Ch1_ExecCmd	Command Execution Bit	Antenna 1	BOOL
		01	*_Ch1_ErrRst	Error Reset Bit		BOOL
		02	*_Ch1_AbtCmd	Abort Bit		BOOL
		15	*_Ch1_RunTestChg	RUN/TEST Bit		BOOL
	n+1	00-15	*_Ch1_CmdSet	Command Setting		WORD
	n+2	00-15	*_Ch1_ProcAdr	Processing Address		UINT
	n+3	00-15	*_Ch1_ProcByte	Number of Processing Bytes		UINT
	n+4	00-15	*_Ch1_DatStorageSet	Data Storage Area Setting (Antenna 1)		DWORD
	n+5	00-15				
	n+6	00-15	*_Ch1_CmdOption	Command Option		UINT
Input (This Unit to CPU)	n+7	00	*_Ch1_IDBusySta	ID Busy		BOOL
		01	*_Ch1_NormEndSta	Command Normal End		BOOL
		02	*_Ch1_ErrEndSta	Command Error End		BOOL
		11	*_Ch1_AntTypErr	Antenna Error		BOOL
		12	*_Ch1_MemErr	Memory Error		BOOL
		13	*_Ch1_AntPwrSplyErr	Antenna Power Supply Error		BOOL
		14	*_Ch1_TestMdSta	Test Mode		BOOL
		15	*_Ch1_UnitBusySta	Unit Busy		BOOL
	n+8	00	*_Ch1_CmdErr	Command Error		BOOL
		01	*_Ch1_DatStorageAreaErr	Data Storage Area Specification Error		BOOL
		03	*_Ch1_ErrCorrection	Error Correction		BOOL
		04	*_Ch1_IDTagSta	ID Tag Status		BOOL
		07	*_Ch1_IDSysErr3	ID System Error 3		BOOL
		08	*_Ch1_IDSysErr2	ID System Error 2		BOOL
		09	*_Ch1_IDSysErr1	ID System Error 1		BOOL
		10	*_Ch1_IDTagMissingErr	ID Tag Missing Error		BOOL
		11	*_Ch1_WrProtErr	Protection Error		BOOL
		12	*_Ch1_IDTagCommErr	ID Tag Communications Error		BOOL
		13	*_Ch1_IDTagAdrErr	ID Tag Address Error		BOOL
		14	*_Ch1_VefyErr	Verification Error		BOOL
		15	*_Ch1_AntErr	Antenna Error		BOOL
	n+9	00-15	*_Ch1_ProcRsltMon	Processing Results Monitor		WORD

I/O	CJ-series I/O memory address		NJ-series Device variables for CJ-series Unit			
	Word number	Bit number	Variable names	Description		Data type
Output (CPU to this Unit)	n+10	00	*_Ch2_ExecCmd	Command Execution Bit	Antenna 2	BOOL
		01	*_Ch2_ErrRst	Error Reset Bit		BOOL
		02	*_Ch2_AbtCmd	Abort Bit		BOOL
		15	*_Ch2_RunTestChg	RUN/TEST Bit		BOOL
	n+11	00-15	*_Ch2_CmdSet	Command Setting		WORD
	n+12	00-15	*_Ch2_ProcAdr	Processing Address		UINT
	n+13	00-15	*_Ch2_ProcByte	Number of Processing Bytes		UINT
	n+14	00-15	*_Ch2_DatStorageSet	Data Storage Area Setting (Antenna 2)		DWORD
	n+15	00-15				
	n+16	00-15	*_Ch2_CmdOption	Command Option		UINT
Input (This Unit to CPU)	n+17	00	*_Ch2_IDBusySta	ID Busy		BOOL
		01	*_Ch2_NormEndSta	Command Normal End		BOOL
		02	*_Ch2_ErrEndSta	Command Error End		BOOL
		11	*_Ch2_AntTypErr	Antenna Error		BOOL
		12	*_Ch2_MemErr	Memory Error		BOOL
		13	*_Ch2_AntPwrSplyErr	Antenna Power Supply Error		BOOL
		14	*_Ch2_TestMdSta	Test Mode		BOOL
		15	*_Ch2_UnitBusySta	Unit Busy		BOOL
	n+18	00	*_Ch2_CmdErr	Command Error		BOOL
		01	*_Ch2_DatStorageAreaErr	Data Storage Area Specification Error		BOOL
		03	*_Ch2_ErrCorrection	Error Correction		BOOL
		04	*_Ch2_IDTagSta	ID Tag Status		BOOL
		07	*_Ch2_IDSysErr3	ID System Error 3		BOOL
		08	*_Ch2_IDSysErr2	ID System Error 2		BOOL
		09	*_Ch2_IDSysErr1	ID System Error 1		BOOL
		10	*_Ch2_IDTagMissingErr	ID Tag Missing Error		BOOL
		11	*_Ch2_WrProtErr	Protection Error		BOOL
		12	*_Ch2_IDTagCommErr	ID Tag Communications Error		BOOL
		13	*_Ch2_IDTagAdrErr	ID Tag Address Error		BOOL
		14	*_Ch2_VefyErr	Verification Error		BOOL
		15	*_Ch2_AntErr	Antenna Error		BOOL
	n+19	00-15	*_Ch2_ProcRsltMon	Processing Results Monitor		WORD

Special I/O Unit DM Area

CJ-series I/O memory address		NJ-series Device variables for CJ-series Unit			
DM number	Bit number	Variable names	Description		Data type
D (m)	00-15	*_Ch1_SysSet	System Settings	Antenna 1	WORD
D (m+1)	00-15	*_Ch1_AutoWaitTm	Auto Wait Time Setting		UINT
D (m+2)	00-07	*_Ch1_WrProt	Write Protection Setting		USINT
D (m+3)	00-03	*_Ch1_AntConn	Antenna Connection Setting		USINT
D (m+4)	00-03	*_Ch1_ProcRsltMonCfg	Results Monitor Setting		USINT

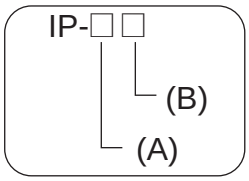
CJ-series I/O memory address		NJ-series Device variables for CJ-series Unit			
DM number	Bit number	Variable names	Description		Data type
D (m+50)	00-07	*_AntForTest	Test Antenna	General	USINT
	08-15	*_TestExec	Test Operation		BYTE
D (m+51)	00-15	*_ByteForTest	Number of Test Bytes		UINT
D (m+80)	00-03	*_MethChgRunTest	Run/Test Switching Method Setting		WORD
D (m+81)	00-03	*_TagMemTyp	Tag Memory Type Setting		USINT
D (m+100)	00-15	*_Ch2_SysSet	System Settings	Antenna 2	WORD
D (m+101)	00-15	*_Ch2_AutoWaitTm	Auto Wait Time Setting		UINT
D (m+102)	00-07	*_Ch2_WrProt	Write Protection Setting		USINT
D (m+103)	00-03	*_Ch2_AntConn	Antenna Connection Setting		USINT
D (m+104)	00-03	*_Ch2_ProcRsltMonCfg	Results Monitor Setting		USINT

A-5 Degree of Protection

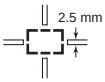
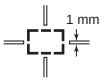
IP-□□ degrees of protection given in this document were confirmed by OMRON based on the test conditions given below. Confirm satisfactory sealing performance in the actual operating environment and under the actual operating conditions before use.

IP = International Protection mark

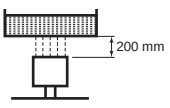
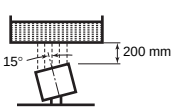
IEC (International Electrotechnical Commission) Standards (IEC60529: 1989-11)

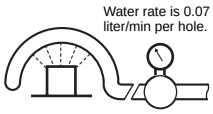
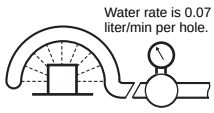
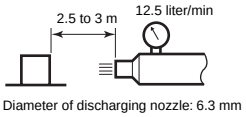
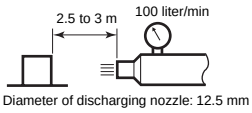
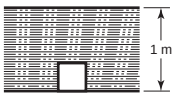


(A): First symbol: Degree of protection against solid materials

Degree	Protection	
0		No protection
1		Protects against penetration of any solid object such as a hand that is 50 mm or more in diameter.
2		Protects against penetration of any solid object such as a finger that is 12.5 mm or more in diameter. Any object with a diameter of 12 mm, such as a finger, will not reach a hazardous part even if it penetrates 80 mm.
3		Protects against penetration of any solid object such as a wire that is 2.5 mm or more is diameter.
4		Protects against penetration of any solid object such as a wire that is 1 mm or more in diameter.
5		Protects against penetration of dust of a quantity that may malfunction the protect or obstruct the safety operation of the product.
6		Protects against penetration of all dust.

(B): Second symbol: Degree of protection against water

Degree	Protection		Test method (with pure water)
0	No protection	Not protected against water.	No test
1	Protection against water drops	Protects against vertical drops of water towards the product.	Water is dropped vertically towards the product from the test machine for 10 min. 
2	Protection against water drops	Protects against drops of water approaching at a maximum angle of 15° to the left, right, back, and front of vertical towards the product.	Water is dropped for 2.5 min each (i.e., 10 min in total) towards the product inclined 15° to the left, right, back, and front from the test machine. 

Degree	Protection		Test method (with pure water)
3	Protection against sprinkled water	Protects against sprinkled water approaching at a maximum angle of 60° from vertical towards the product.	Water is sprinkled at a maximum angle of 60° to the left and right from vertical for 10 min from the test machine. 
4	Protection against water spray	Protects against water spray approaching at any angle towards the product.	Water is sprayed at any angle towards the product for 10 min from the test machine. 
5	Protection against water jet spray	Protects against water jet spray approaching at any angle towards the product.	Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. 
6	Protection against high-pressure water jet spray	Protects against high-pressure water jet spray approaching at any angle towards the product.	Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. 
7	Protection underwater	Resists the penetration of water when the product is placed underwater at specified pressure for a specified time.	The product is placed 1 m deep in water (if the product is 850 mm max. in height) for 30 min. 
8	Protection underwater	Can be used continuously underwater.	The test method is determined by the manufacturer and user.

Oil resistance (OMRON in-house standard)

Protection	
Oil-resistant	No adverse affect from oil drops or oil spray approaching from any direction.
Oil-proof	Protects against penetration of oil drops or oil spray approaching from any direction.

Note This OMRON in-house standard confirms resistance to cutting and other oils. It is equivalent to the former JEM standard.

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